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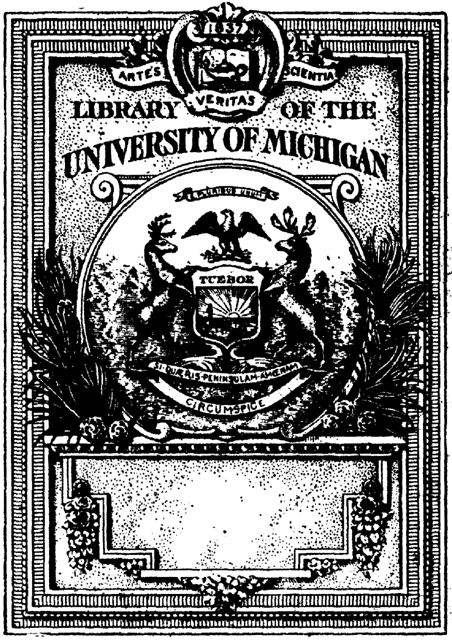
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MEMOIRS

OF

THE BERNICE PAUAHI BISHOP MUSEUM

OF

POLYNESIAN ETHNOLOGY

AND

NATURAL HISTORY.

Vol. I.—No. 4.

Ancient Hawaiian Stone Implements.

BY WILLIAM T. BRIGHAM, A.M.

HONOLULU, H. I.;
Bishop Museum Press.
1902.

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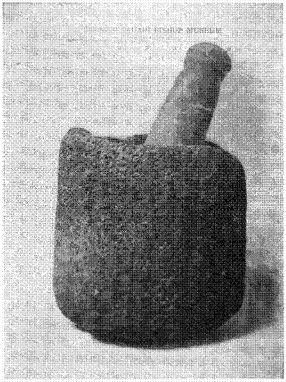
STONE IMPLEMENTS AND STONE WORK

OF THE

ANCIENT HAWAIIANS.

BY WILLIAM T. BRIGHAM, A.M.



Memoirs of the Bernice Pauahi Bishop Museum.

VOL. I. NO. 4.

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PREFACE.

In selecting the Stone Implements of the Ancient Hawaiians for the subject of the next chapter of what I had some years since intended should be a history of Hawaii, or rather of the Hawaiians before the advent of other and very different racial influences, it may be fair to explain to my readers, almost at the start, my method in this fragmentary edition of such information about old Hawaii and its customs as I have been able to gather during the past thirty-six years. And here I must be pardoned for thrusting a personality into what I greatly desire to make a clear and impersonal statement of facts.

When I came to these islands a young man full of enthusiasm, fresh from the teachings of Agassiz, Gray, Wyman and Cooke, eager to study nature in all her aspects, unbiased by theory, only anxious to learn, I found a land where traces of a native civilization were not all effaced. The American Mission had labored a little more than forty years and the results of their work were still vigorous: the missionary homes still existed, oases in the outlying districts, where I could talk with venerable men and women who had landed in 1820 when the young son and successor of Kamehameha had cast aside all that his ancestors had held sacred in religion, and was not yet ready to assume new responsibilities,—indeed he hardly gave much thought to the great change that was impending. One era was at an end, another was on the threshold. Hitherto intercourse with foreigners had but little modified the native ways of living. There had been no interruption of the ancient worship although it had been for years falling into mild decay. The admirable unwritten system of law regarding land tenure, water rights, fishing privileges, and the stern but generally beneficial kapu were almost unimpaired, and that little band of missionaries that went like Joshua's spies to view the land, and whose story is so charmingly told in Ellis' *Tour of Hawaii*, found people and things much the same as did the wrecked Spaniards when they knelt on the Hawaiian beach three centuries before.

I never had the pleasure of meeting William Ellis, but I have corresponded with him. I have met and lived with most of the other early missionaries, and if they were perhaps more anxious to remove those obstacles to eternal health which threatened the interesting people they had come to save, than to study the past history and work connected so intimately with what they considered a fallen state, their desires were sincere and unselfish, and they were always ready to place their journals at my disposal and to answer questions which must at times have seemed to them almost idle.

Other sources of information, now closed forever, were then open to the traveler among the Hawaiians. In the remote valleys the sound of the kapa beaters still echoed from the pali, and the ancient fabric was still worn to some extent. I have gone to rest in a grass house by the light of a stone lamp filled with kukui oil, after my native hosts and I had conversed by the light of the more primitive string of kukui nuts. I had for my guide on the island of Molokai a man who had officiated as priest in the native temple whose ruins he was explaining to me. Mateo Kekuanaoa, the father of two kings, and the most intelligent native I ever met; John Ii, Charles Kanaina (father of King

Lunalilo), King Kamehameha V., were all living and willing to contribute to the notebooks I was filling more with a desire of gaining and retaining information than with any view of future publication. Many humbler contributors added to the store when in mountain journeys they wrote for me the names they all then knew of bird or plant or place.

For years these notes were useless although they came back with me to these islands in 1888, but when a few years ago I expected to leave the Hawaiian group forever, I destroyed all that I could lay hand upon as useless baggage in my proposed wanderings. That any escaped was due to the change of plans before I had time to read them all through before consigning them to the fire. From this examination they are still fresh in my memory although it is quite possible that the details might have been more complete had the originals been still before me.

From these sources more than from the voyagers, I shall draw in the proposed sketches of the Hawaiians. I have left untold the tiresome accounts of battles, and I have been so unorthodox an historian as to care very little for thronal succession, if this term can be used where the kings had not even a stool to sit upon, or for the genealogies, for I have seen them falsified to satisfy ambition. I have already published an account of the curious Feather Work of the Hawaiians and I now take up the Stone Work, intending to continue the series with Wood Work, Mats and Baskets, House Building, Food and Cookery, Games and Sports, Warfare, Dress and Ornament, Religion, Kapa Making, Cord and Netting, Fisheries, Canoes and Voyages, Medicine, Chronology, Water Rights, Land Tenure and Kapu. These chapters are partly in order and will be presented as material on hand seems sufficient, and not necessarily in the above sequence.

In this chapter I have endeavored to illustrate all the genuine old Hawaiian implements, but constantly in the course of writing new examples have come to me and I cannot suppose that I have encompassed all within the limits of these few pages. It has been an object with me in all this work to present to those who cannot examine the collections in this Museum as clear an idea as possible of what they comprise, and as this must be rather in the nature of material for farther study and comparison, I have not encumbered my pages with many references to other works or parallel examples, which might exhibit the number of books on kindred subjects I may have read, but would add little to a knowledge of these Hawaiian matters. Where the material exists in this Museum, or is familiar to me in other museums, for comparison between Hawaiian and other Polynesian examples I have briefly called attention to the divergence or parallelism, but I have refrained, as far as possible, from mere conjectural relationships as proving common derivation, preferring to reserve such discussion until all the evidence at my command in all the departments of this series has been fairly presented.

ALAMAKANI, October 26, 1901.

STONE IMPLEMENTS OF THE ANCIENT HAWAIIANS.

A chapter treating also of the ancient Stone Work, Sculpture and such remains as are at present known either in Museums abroad or on these islands by **William T. Brigham, A.M.,** *Director of the Bernice Fauahi Bishop Museum.*

IN the Pacific Region it is not necessary to discuss the tools of primitive man: the first known inhabitants of the Pacific islands were many thousand years removed from primitive man, and the delicate questions of tertiary or early quaternary remains may be wholly eliminated. We need not, even for convenience, divide the remains of tools used here into stone, bronze or iron periods. There were no such divisions. Neither iron, copper, nor tin was accessible to the islanders, and from the time they landed on the bits of land scattered through this ocean, whether it be five or twenty centuries ago, they used wood, stone, bone or shell for the purposes where modern civilized man uses the metals or pottery, and this use was universal until little more than a century ago when iron and foreign tools were introduced here and there among the islands. Even on the Hawaiian islands metal tools were far from common in the middle of the last century.*

If in this region there was a counterpart to the fabled Atlantis of the lesser ocean, in the diluvium that removed its possible inhabitants all their work perished with them and the little islands which perchance serve as gravestones to the lost continent are unmarked by any inscription. The architectural or sculptured remains today found on Rapanui, Tonga, the Marianas and elsewhere are the work of people not remote from the present or historic inhabitants. There are tools of rude form and careless workmanship from the Pacific islands; forms that unconnected with their more modern representatives would puzzle the antiquarian, but there is nothing truly in the nature of incunabula.

If then the mystery of the birth of primitive implements is not to be approached on these islands; if the oldest of the tools cannot boast an age of more than twenty centuries, modern indeed in the history of the human race, what have we left? Simply the rude implements of an intelligent people who had arrived at a certain stage of civilization when they left their home and sought another in the Pacific. What they had formerly must have been greatly modified by the new environment, but in their

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*In 1850 Rev. Mr. Forbes speaking of his district of Kealakeakua said, "Axes are very rare........There is not a native carpenter who owns a set of tools, to my knowledge on this island [Hawaii], the population of which is 30,000 or more. Here and there one owns a saw and an adze; rarely any however except canoe diggers, and the tools they have usually belong to some chief for whom they work." Rev. H. T. Cheever, *The Island World of the Pacific*, p. 221, New York, 1851.

rude tools and methods perhaps is hidden the most definite clue to the origin of the Pacific immigrants, but this will not here be discussed for the space at our disposal is otherwise bespoken. Of all that remains stone is the most durable material but with all its hardness it bears the imprint of human hands as the hard bone yields to the softer muscle, and some one may take these stone records, add to them the other works and customs of the ancient Hawaiians and perhaps solve the enigma of their origin.

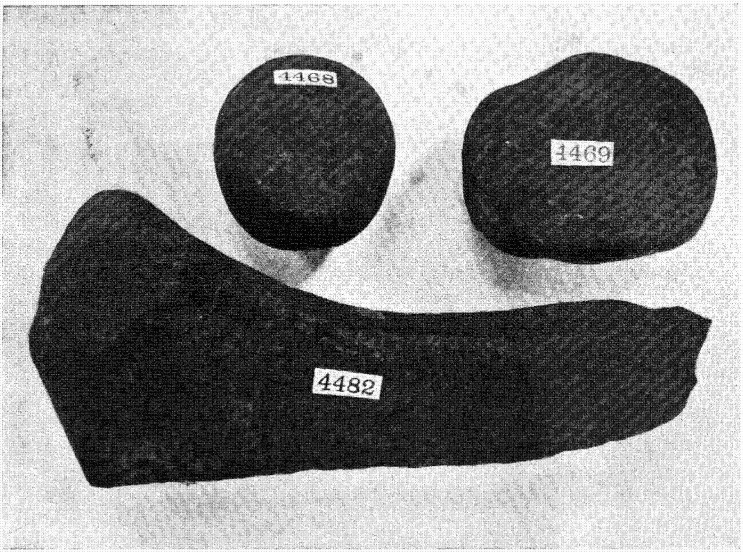

FIG. 1. HAWAIIAN STONE HAMMERS.

At present too little is known of the archaic languages as well as customs of the encircling nations or peoples, at the time of the first irruption of the ancestors of the Pacific islanders, to study the problem with profit.

How much memory of a previous civilization the Pacific immigrants brought with them we may never discover: certainly they could not have brought much in the way of household goods, and from what we know of their early voyages the bulk of their cargo must have been food. Tradition on all the groups points definitely to the arrival of the first settlers in canoes; the more recent immigration to New Zealand even preserves the names of the canoes which were later transferred to the tribes springing from the crews. On landing, a waterworn log, such as may be found on most beaches, would perhaps be the first implement used in rolling the heavy canoe ashore. The presence of a canoe argues the possession of cutting tools and of considerable skill in their use, but if any were brought with them these must in time have worn out, and new ones were to be provided if the newcomers were not to fall back in their civilization. Axes were perhaps the first tools needed for we may believe that there were no hostile tribes to drive from most of the islands, and we know that there were no dangerous animals to exterminate. Shelter and the simplest wants of camp life require the axe and hammer. To make an axe a hammer is needed and a fragment of stone serves this purpose better than a more civilized man can understand until he has seen a pebble in a deft hand shape an axe, a pestle or a dish. One fragment is doubtless more convenient than another and a rounded form easily held in the hand has been selected by most primitive people. The Maori of New Zealand twisted a withe around the stone to make a handle (No. 1539, Fig. 2) and the Australian fastened the stone to a simple handle by means of a very tenacious gum (No. 1922, Fig. 2), but the Hawaiian did very good work with the handle Nature has provided in his strong right arm. Now as the actual priority of many of the simple stone implements must be simply a matter of conjecture, I prefer to leave to everyone including myself, full liberty to arrange their descriptions in the most convenient order without prejudice to any theory of sequence.

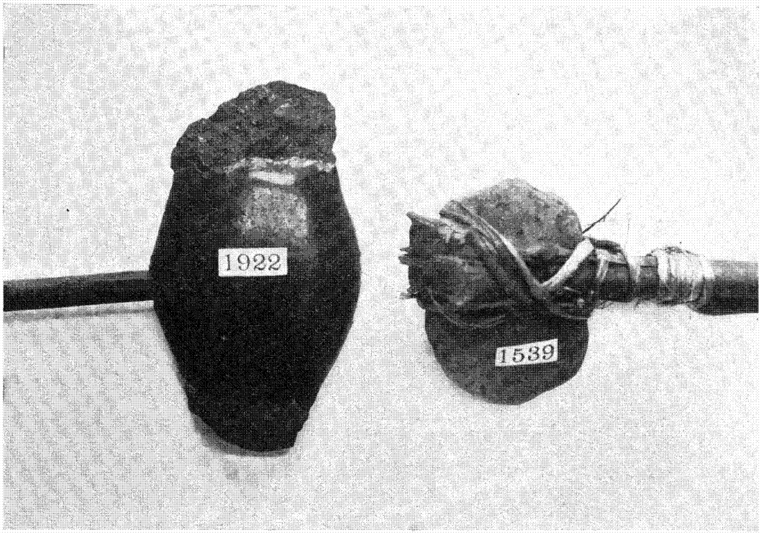

FIG. 2. AUSTRALIAN (1922) AND MAORI (1539) HAMMERS.

Hammers.—Taking first then the hammers as the most simple, least artificial, and perhaps for that reason what we have fewest specimens of in our museums, we might perhaps with the conceit of modern civilization ask what people without nails needed hammers for. Perhaps, the earliest use was to drive a stake for which a smooth stone of rounded shape was more convenient than a rough fragment of stone, as any man who has ever camped out knows very well. Other stones must be split and chipped to form axes, and very early in the history of the human race it was found that a sea-worn pebble was a suitable tool to knap flint or chip clinkstone. Coconuts* in these tropical regions must be opened in the skilful way that every old native well knows lest the precious liquid be spilled; kukui nuts must be cracked without bruising the kernel which is to be used for a candle; the bark of the shrubs used in making first strings, afterwards *kapa* or bark cloth must be beaten;† then when the wooden bowls and dishes so common among the Hawaiians cracked or were broken, little pegs (which were indeed nails) must be carefully hammered into the breach; in the basket work

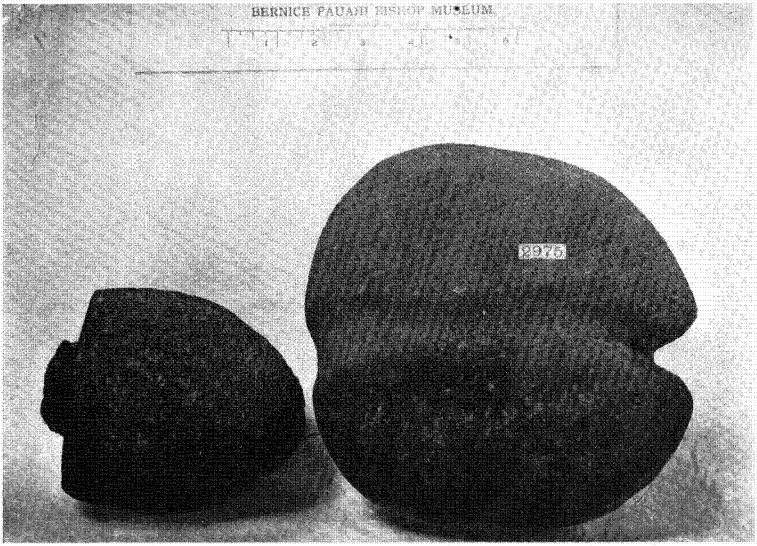

FIG. 3. HAWAIIAN CANOE BREAKERS.

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*Coconuts (*Niu*), the fruit of a palm whose home was on the isthmus of Darien, were probably introduced by the first comers. If planted immediately in this climate at least eight years would be required to reach the bearing age. Ocean waves would not bring these valuable nuts to the Hawaiian Islands which are washed by a northeastern current, and are on the extreme northern limit within which this palm flourishes.

†Although in later days specialized beaters were used for this purpose, as will be shown in the chapter on Kapa Making, at first simple stone hammers served the purpose as among the Maori and other Polynesian people.

successive loops or layers must be hammered into place; the poi pounders were shaped as we shall see when we come to this indispensable implement, and in fine the uses of the simple pebbles with slightly flattened sides as shown in Fig. 1 (4468 and 4469) were even more general than those of the beautiful but specialized hammer of a modern tool chest. In the same figure No. 4482 represents a natural fragment of lava used as a hammer for general purposes in an Hawaiian family for several generations: it is a convenient tool and has the advantage of the shabby umbrella in being less in demand by the borrower.

Canoe Breakers.—In general no handle was used on Hawaii as by the Australians, Maori and so many primitive people, but in a certain modified form of hammer a flexible cord of coconut fibre was substituted for a handle precisely as the rope handle of the iron ball used at the present time in the athletic exercises of "throwing the hammer". Hawaiians used these large and heavy hammers in war to break canoes. They were also swung in the powerful grasp of the Hawaiian chief much like the "morning stars" of mediæval warfare. In the specimen (7945) on the left of Fig. 3 the knobbed neck to which the rope was plaited has been broken off, but in the Munich museum there is a fine specimen, Fig. 4, with the rope attached. The right hand specimen (2975) had a groove for the encircling cord and it has also been used in later times as a pounder of roots both edible and medicinal. And here let us remember that the simpler the tool the more varied its uses. This grooved pebble can be an active hammer or a passive sinker to a net; a stone cup may be a lamp or a paint pot or even a chafing dish in which to burn souls, as will be described later when Hawaiian religion is considered. While it is certainly convenient to call or label a specimen by a definite name, another person may prefer another designation for what he considers the more important rôle the article may play.

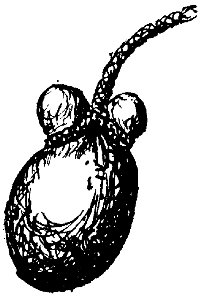

FIG. 4.

Stone Used.—The materials used in fashioning the implements of the Pacific islanders may be enumerated here. The list is not a long one, if we eliminate introduced material, as for instance, granite brought as ballast from China and eagerly sought by the old Hawaiians for sinkers. Of simple minerals we have calcium carbonate in the form of corals and of stalactite in the caves in raised coral reefs, and in a more compact variety resembling marble where lava streams have run over the raised and consolidated reef; Calcium sulphate or gypsum also found in caves or raised reefs and used for the shanks of fish hooks: red ferric oxide or hematite is found in masses of small size in Hawaiian lava flows and is used for clappers and sinkers. Of the rocks composed of several minerals the most common and important is basaltic lava in all its protean forms. From this are made the lamps, dishes, cups, balls, pestles, sinkers, etc., and it is found in nearly all the high islands of the Pacific. Found with this is phonolite or clinkstone, invaluable for adzes and grindstones; it is of a most compact structure, brown, gray, or even black in color and is a mixture of sanadine, felspar, nepheline, hornblend and nosean.* It is found with the older lavas, and on these islands generally at a considerable elevation; on Mauna Kea at 12,000 feet. As its name implies it has a very metallic clink, and old worked specimens often simulate cast steel.

Obsidian or volcanic glass is not a product of the Hawaiian volcanoes but is found elsewhere in the Pacific and is important for the cutting qualities of its glass-like fractured edges. From Rapanui in the extreme east come the dagger heads, and from the Admiralty group at the western edge of the Pacific region come the spear heads and the capital daggers of which a specimen is shown in Fig. 5 (No. 1562). The Rapanui dagger heads, of which three are shown in the same figure, are of coarse, almost stony obsidian and when used are fastened to short wooden handles. Masses of clear obsidian from New Zealand but no objects made from it are in this Museum. In Mexico this volcanic glass was greatly used in olden times for inlaying as the Maori used paua shell and also for the keen narrow knives used for circumcision and other surgical operations.

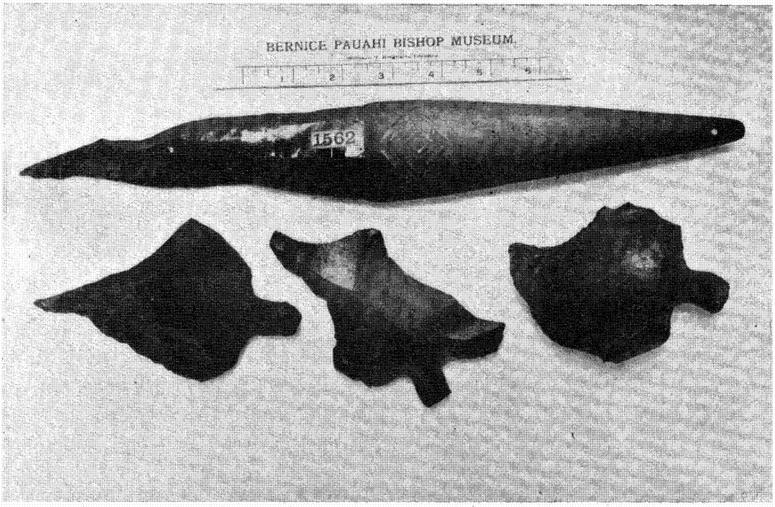

FIG. 5. OBSIDIAN DAGGER AND DAGGER HEADS.

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* The chemical composition of an average specimen is given as: Silica 57.7, Alumina 20.6, Potassa 6.0, Soda 7.0, Lime 1.5, oxides of Iron and Manganese 3.5, Magnesia 0.5. Specific gravity about 2.58.

Pumice (basic) is found as a froth of a greenish hue about the Hawaiian volcanic vents but owing to its extreme friability is not used as is the trachytic pumice drifted to the Hawaiian shores, perhaps from the Alaskan volcanoes; this is found buried in the sand beaches on the windward side of Kauai, and has been used from the earliest times as a polishing material.

Coral limestone is of considerable importance throughout the Pacific region and is often crystalline, hard and compact without much indication of its original structure; in this condition it is used for pestles, poi-pounders, dishes, weights, etc. Calcareous limestone is found compacted of the sand and debris of the reefs blown ashore and cemented by æolian influences, but it generally is not hard enough for making tools, although sometimes good as building stone. The coral reef rock was once used largely by foreigners for building purposes as it can be cut from the reef at low tide with an axe and on continued exposure to the air it hardens. The first church in Honolulu is entirely constructed of this material, but I do not know that the old natives made any extensive use of it in the construction of temple walls or even the walls of fish ponds. Where lava streams have flowed over the raised reef the limestone has almost the appearance of marble, although never in thick beds. In cases where it is granular, like coarse sandstone, it is frequently very hard and tenacious, making capital pounders (Figs. 35 and 37). With this material should be classed the shells so important on the atolls where no stone of any other nature occurs. The huge Tridacna

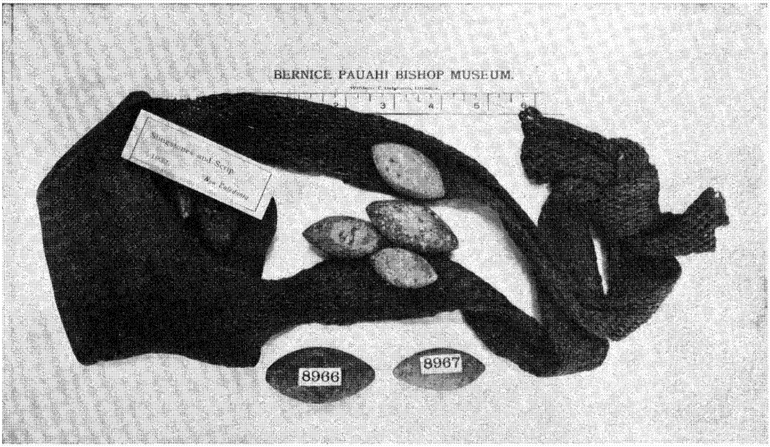

FIG. 6. SLINGSTONES FROM NEW CALEDONIA AND GUAM.

is a quarry for adzes which vie with those made from clinkstone in durability and the power of retaining a cutting edge.

While in the eastern Pacific phonolite is the important material for adzes and chisels, in New Zealand, New Caledonia and other western islands greenstone* largely takes its place. Nephrite or Jade is frequently used for ornament or amulet and even for adzes, while an aluminous form, Jadeite, is used for the blades of ceremonial adzes or axes in many islands of the Bismarck archipelago (Pl. LX.).

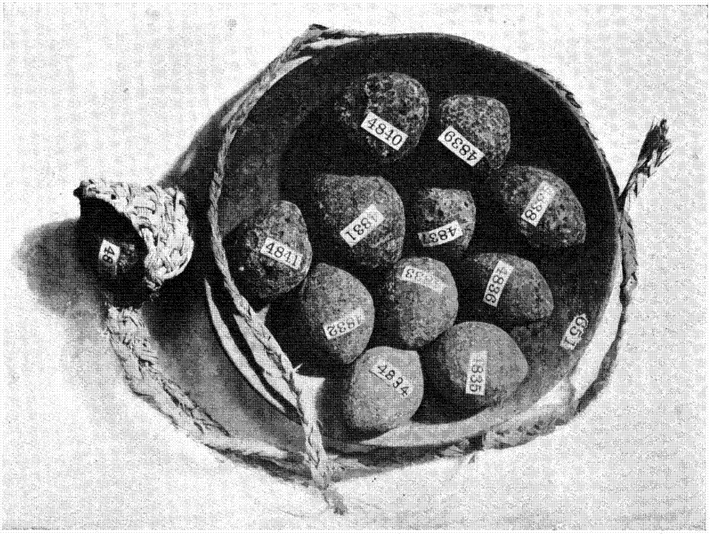

FIG. 7. HAWAIIAN SLING AND SLINGSTONES.

Slingstones.—A hammer with a detachable handle was widely used in Polynesia. Next to a club a stone seems a most handy weapon and is often nearer at hand than a stick. When in the olden time a Hawaiian was obliged to travel into the upper region of the mountains he was much in the habit of taking a stone in his hand for protection albeit no more substantial enemy was to be met than the *aumakua* or spirits whose domain he placed in the waste places above the forests. The smooth pebble from the brook with which the Jewish shepherd boy slew the Philistine giant was very primitive as a weapon beside the slingstones of the Pacific islanders. Where the improved form originated or who was the inventor may never be known; certain it is that all through the Pacific an elongated form with conical terminals was in use. Far away in the Mediterranean the Balearic islanders were sought as the most skilful slingers in the Roman, Greek and Carthaginian armies, and the *nux plumbea* of the Romans was not unlike the stone projectile used by the Hawaiians.

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* A fuller account of greenstone will be given below in the notice of the Maori implements and ornaments.

The New Caledonian on the west had the lightest and most acute slingstones while the Hawaiian in the east had the largest and heaviest, and in both cases, as may be seen from the illustrations (Figs. 6 and 7, and Plate XXXI.) the stones were almost always double cones. Rolled patiently between flat stones with motion from right to left as well as back and forth, the stone fragment gradually assumed the form best suited to insure directness of aim as the missile could be made to revolve on its axis, like a rifle ball, by the skill of the slinger. The average weight of the New Caledonian stones in this Museum is 1.56 oz., and their length is 1.75 in.; of the Hawaiian 4.73 oz. and 2.65 in. The material of the former is a sort of steatite, of the latter lava, and of those brought from Guam by Mr. A. Seale, stalactite. It will be noted that all these stones average lighter than cricket balls (5.5 oz.) or base balls (5.2 oz.).

The collection of slingstones shown in Fig. 7 was found on the grounds surrounding the Bishop Museum beneath a large fragment of lava which was being removed for building purposes. This was near the ancient path from Waikiki to Ewa, on the top of the slight ascent from the marshes. Perhaps the warrior had here placed his ammunition to drive back some enemy using the trail and death had claimed him before his stones had all been slung.

The following table will show the size and weight of the stones figured:—

PLATE XXXI.

4822.	Compact lava, 2.65×1.6×1.5 in., 5 oz.
4814.	Brown lava, 3×1.9×1.7 in., 7 oz.
4818.	Smooth finish, 2.85×1.7 in., 6 oz.
4813.	Compact lava, 3.1×2.1 in., 10 oz.
4820.	Lava, 3.4×1.9 in., 10 oz.
4824.	Grey, clay-like, 2.7×1.8×1.7 in., 6.5 oz.
4826.	Red, porous lava, 2.4×1.7 in., 5.2 oz.
4823.	Clay (palolo), 2.6×1.5 in., 4 oz.
4821.	Clay (palolo), 3×1.6×1.4 in., 4.5 oz.
4815.	Rolled lava, 2.6×1.9×1.7 in., 6.5 oz.
4828.	Cellular lava, 2.4×1.6 in., 5 oz.
4825.	Claylike, 2.5×1.6×1.5 in., 4.5 oz.
4830.	Cellular lava, 2.3×1.5×1.4 in., 4 oz.
4829.	Smooth, 2.4×1.4×1.2 in., 3.2 oz.
4816.	Rough rolled, 2.4×1.5 in., 3.7 oz.
4812.	Brown, smooth, 2.4×1.8 in., 6 oz.
4817.	Grey lava, 2.6×1.6×1.4 in., 4.5 oz.
8051	Ground, 2.6×1.6×1.5 in., 4.7 oz.
8049.	Very irregular, 2.8×1.5×1.4 in., 5 oz.
7648.	Rough, tufa-like, 2.3×1.7×1.6 in., 5.2 oz.
4819.	Lava, 1.9×1.65 in., 3.7 oz.
8048.	Cellular lava, 1.9×1.45×1.2 in., 3 oz.
4827.	Lava, 2×1.5×1.3 in., 3 oz.
7749.	Flattened, 2.1×1.5×1.1 in., 2.7 oz.
4842.	Round, rough (Noa?), 1.5 in., 3 oz.

FIGURE 7.

4831.	Rolled lava, 2.35×1.9×1.8 in., 6.5 oz.
4832.	Rolled lava, 2.1×1.6 in., 4.5 oz.
4833.	Rolled lava, 2.1×1.65 in., 4.5 oz.
4834.	Cellular, 2.1×1.5×1.4 in., 3.5 oz.
4835.	2×1.65×1.5 in., 4 oz.
4836.	Well-rolled, 2.2×1.55×1.45 in., 4 oz.
4837.	Cellular, 1.7×1.5 in., 3 oz.
4838.	Defective, 2.4×1.65×1.5 in., 4.2 oz.
4839.	Nearly round, 1.9×1.7 in., 4 oz.
4840.	Cellular, 2.2×1.7×1.6 in., 4.7 oz.
4841.	Cellular, 2.1×1.5×1.4 in., 3.2 oz.

Average 2.65×1.64×1.54 in., 4.73 oz. The heaviest weighs 10 oz., the lightest 2.7 oz.

The simple sling of pandanus was the most inartificial of any used in the Pacific. The Caroline islanders had a handsome sling of braided coconut fibre. The form of sling and their use in warfare does not concern us at present and we may pass to the next stone implement.*

Anchors.—Certainly the anchors used by the Hawaiians before the advent of iron were hardly manufactured. Often a mere stone to which a cord of coconut fibre could be attached served the purpose of holding the canoe temporarily on the shoals near shore. More commonly the canoe of a chief was provided with a stone through

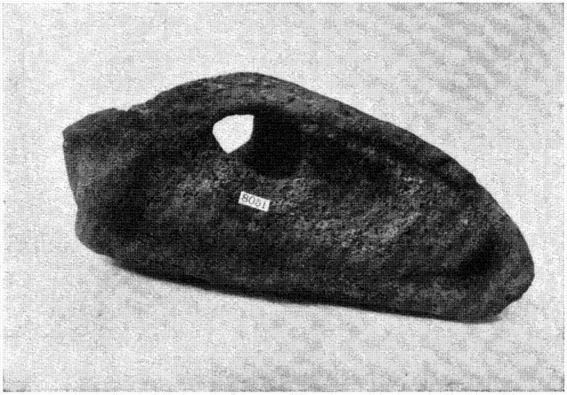

FIG. 8. HAWAIIAN ANCHOR BELONGING TO ONE OF KAMEHAMEHA'S CANOES.

which was a natural hole (Fig. 8) a form not hard to find among volcanic rocks. When a convenient hole could not be found a strong net of olona was put around a stone of suitable size and the painter made fast in this way. In sea water abounding in marine worms canoes could not be left long at rest in the water but were drawn out on the beach, when not in actual use, so the need of an anchor was less; in fishing it was sometimes important.

Grindstones.—In New Zealand the presence of sandstone ledges brought together workmen of various tribes to grind or polish their adzes, etc. The same was the case in Australia, but the Hawaiian had no sandstone fit for the purpose and he used the flat slabs of phonolite which often present a parallel cleavage and so form plates sometimes thin enough to use as covering slates. The hardness sometimes made the stone a whetstone rather than a grindstone and the labor must have been immense. In Fig. 9 may be seen examples of grindstones long used and now in the Bishop Museum. The illustrations are fair examples of the worn surfaces of Hawaiian grindstones. In all that have been observed there is an absence of grooves; the abraded surface is always an even, shallow concave.

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*The use of slings was general all over the world, and from the earliest times, and they were, before the invention of firearms, no contemptible weapon. In the chapter on Hawaiian warfare their effectiveness as well as their various forms will be considered. The battle of Nuuanu (1795) was perhaps the last great conflict in which Hawaiians made use of slings.

Grindstones are among the oldest of Hawaiian stone-working tools and their use (except for an occasional knife-sharpening) had ceased long before I had any knowledge of the islanders. That stone balls (Fig. 10) were formed by long-continued rolling between stones of this class is well known, and I am assured that two long narrow stones like the lower one in Fig. 9 were used for this purpose, a man squatting in the native manner at each end and communicating a reciprocating motion to the upper stone as in the operation of sawing. Without cutting sand the operation must have been a tedious one, yet the many specimens extant show that a great deal of this grinding must have been done. The finish is by no means the same on all, but the use to which the balls were put in the games required a fairly spherical periphery. Immense balls of a generally spherical form but rough surface are known as "puts" of some native Hercules, and these are generally unworked and often merely the residuary nucleus of a decomposing mass of lava. One very fine one once in a private collection on Molokai was fabled to have been rolled nearly the length of that island, destroying forests in its course. Another in the Bishop Museum more than a foot in its smaller

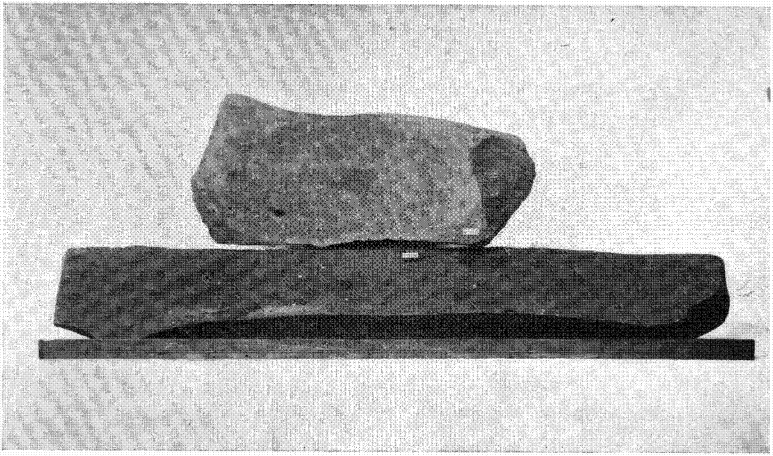

FIG. 9. HAWAIIAN GRINDSTONES.

diameter, and weighing eighty-seven pounds was used as a test of strength on Kauai. The largest in the illustration (No. 3588) was used as a bowl, is of good surface, weighs twenty-two pounds, and is seven and a half inches in diameter.

Similar but flatter grinding stones were used on other groups, as the Solomon, Gilbert and Caroline islands, to grind the shell money of those places. In that operation the fragments of sea shells or of coconut shells were roughly rounded by the hammer, drilled and strung on the midrib of palm leaflets, often a score or more at a time, and rolled until polished. Specimens in the Bishop Museum from all these islands show great skill and a beautiful finish. The flat stones on which the Australian ground edible seeds and shaped adzes in turn must be classed with these Hawaiian grindstones. In no case have I seen any ornamentation or definite shaping such as the Mexican both in olden time and now gives to the *metate;* all the grindstones of the Pacific islanders were strictly utilitarian.

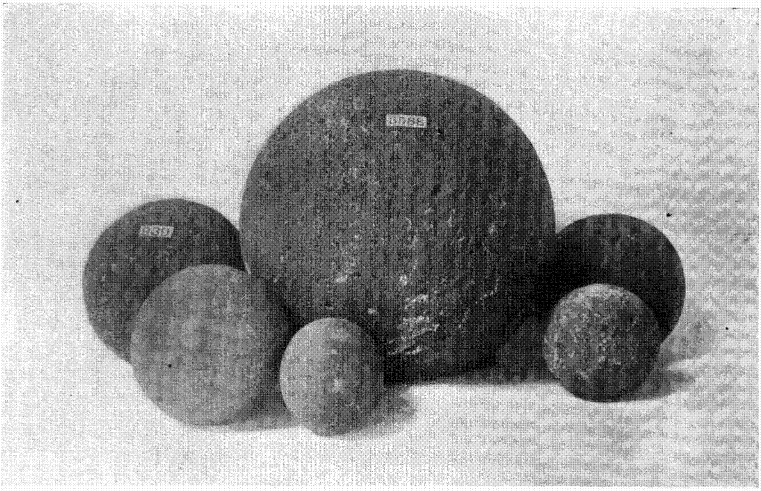

FIG. 10. STONE BALLS USED IN GAMES.

Polishing Stones.—With the exception of adze-sharpening and ball-rolling, the large flat grindstones were not much in demand, the smaller stones, even round pebbles taking their place as more portable and more convenient of application to any surface however irregular. Here again the diversity of uses for the same simple tool is well seen, the pebblestone hammer being very generally, especially by the Maori, used for a polisher.

For coarse abrasion of comparatively softer substances the cellular lava of the Hawaiian volcanoes affords a capital means. The hard, glassy, silicious crust on the flows is full of cells and generally occurs in very convenient tablets as may be seen in Plate XXXIV., No. 3053. When these are partly worn so as to open the first layer of subcuticular cells a most efficient rasp is at hand. This hard cellular lava also occurs in thicker layers and from these, besides a common rasp, a tool of very ancient application was made as shown in Fig. 11. The Hawaiians were a race addicted to bodily cleanliness, and as they had neither soap nor a very suitable sand, this evenly rough

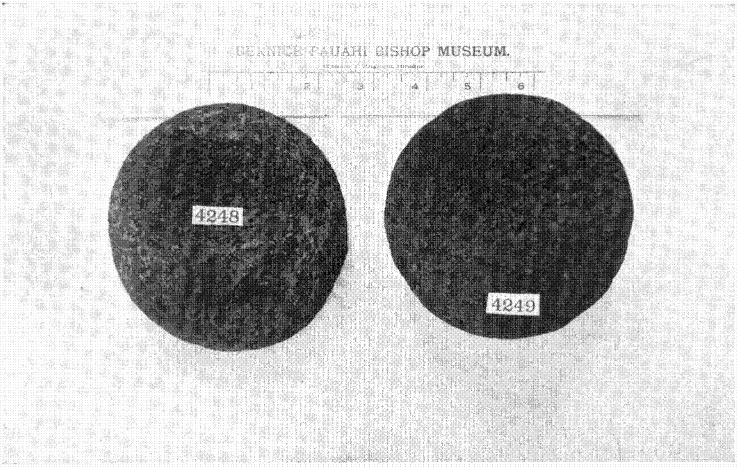

FIG. 11. HAWAIIAN BATH RUBBERS.

stone was their best detergent much used in the olden days. The two specimens figured (4248 and 4249) were used by the Kamehameha family and the spherical cells are still blocked by the abraded royal cuticle. In the same connection pumice was used as a frictional depilatory, as well as to reduce callosities of the skin. Large blocks of pumice were used to remove the bristles from pigs before baking. Another convenient use of the flat plates of cellular lava was for files when broken into strips and rounded. The beautifully finished Hawaiian bone and shell fish hooks were wrought with these apparently clumsy implements which were also required to keep them sharp. The *apuapu anai makau* or fish hook sharpeners (Fig. 12) were found all over the group, but from their small size and brittle nature not many are preserved in collections.

As a rule the cellular lava served to do the rough work on the wooden bowls rather than the polishing proper, and the same may be said of the coral blocks which came next in roughness. In fine work the usual succession was fine coral, or *puna*, *pohaku eleku* a rather soft, brittle stone, rough pumice or *ana oahi* (baked pumice), *olai*, *oio* and *lau ulu* or dried leaves of the breadfruit tree. A large variety of polishing stones may be found on Plates XXXII.–XXXV. The *oio* was a stone used especially to polish canoes. It was early discovered that the shape of the polishing stone contributed to its efficiency and the smoother back and the raised knob, ridge or handle soon followed. On the hard woods of Hawaii a long continued rubbing was necessary. The glassy polish affected by the modern fanciers of Hawaiian bowls was, of course, never found on the old dishes or bowls. The polish given by the skilful old Hawaiian with the breadfruit leaves was more lasting as well as more tasteful than the modern French polish. The plates will show fully the various forms and texture of the more common polishing stones and a minute description is unnecessary. The patient application of whatever medium was the secret of the beautiful finish of the best of the old *umeke* or bowls.

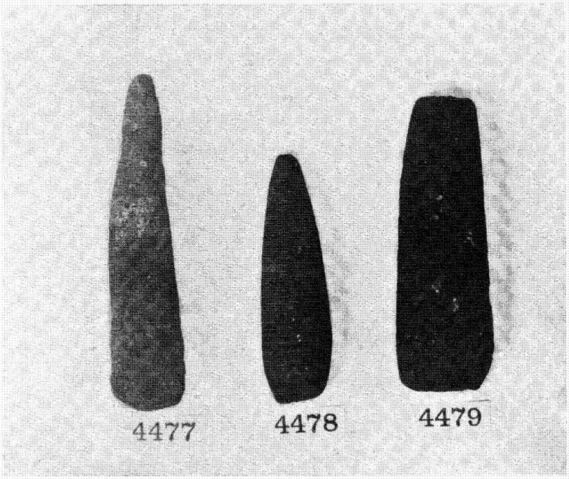

FIG. 12. HAWAIIAN FILES FOR FISH HOOKS.

Door Stone.—Not what is usually meant by that term, but here a literal translation of the Hawaiian name *Pohaku puka*. As the Hawaiian house made of a light frame covered with grass could not be safely bolted when the small entrance door was closed at night, an ingenious contrivance was sometimes used which, if it would not prevent housebreaking would probably wreak vengeance on the intruder. It may be stated that the door was very low, seldom exceeding three feet in height, and one entered as a quadruped. Across the way was stretched a cord over a short peg near the bottom of one door post and by this cord was suspended directly over the entrance a heavy stone. One in the Bishop Museum is shown in Fig. 13. It weighs 36.7 pounds and would be likely to disable if not kill outright any person on whose back it might fall. This is the only mantrap among the Hawaiians which has come to my notice.

Squid-hook Sinkers.—Among the products of the sea few were more generally acceptable to the Hawaiians than the squid or *hee*. Both fresh and dried it was a favorite concomitant of *poi* the national dish. To capture it on the reefs where it abounds, a peculiar hook was used which will be more fully described in the chapter on the Fisheries, but here it must be shown (Fig. 14) to explain the use of the stone sinker. The spindle to which the bone hook is attached has at the opposite end the stone sinker bound face to face with a cowrie, usually *Cypræa tigrina*, which is a favorite bait for squid. When lowered to the bottom the stone falls beneath and is hidden by the shell: the hook is partly concealed by the blades of grass bound to the spindle near it. When the squid grasps the coveted shell, the fisher pulls the line and if all goes as planned, the hook enters the soft body of the mollusk which is then drawn in through the ink which it emits. In Tahiti, instead of a whole shell, fragments are bound like shingles over the sinker which is less carefully cut than by the old Hawaiians. Plates XXXVI.–XXXIX. show a large series of these sinkers which are of various material, even foreign stone from ship ballast. No relic of the old stone time is more abundant than these squid-hook sinkers, and the abundance is due to the fact that they were easily made, and like poi pounders their use continues to the present day. I have seen the old stones used as sinkers to a net as well.

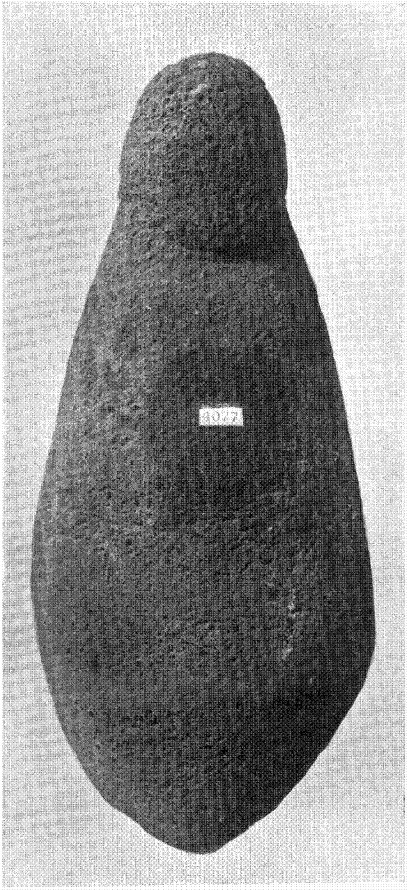

FIG. 13. HAWAIIAN DOOR STONE.

Stone Knives.—While the native bambu furnished convenient knives very generally in use whether to trim kapa or circumcise a lad, stone was also in use for heavier work such as carving a dog or pig. No specimens are known that show any care in working; simply a split stone with a more or less sharp edge not enhanced by grinding and unprovided with any handle as shown in Fig. 15. Such a rude implement could hardly be classed with edge tools. It was not so far advanced as the rough flensing knives of the Chatham islands Moriori, where the stone is shaped to some extent and the handle is formed. Fig. 16 shows these knives used by the Moriori for cutting the blubber from whales or other oil yielding mammals. Still less could they compare with the more finished obsidian knives from the Admiralty group shown in Fig. 4. Probably not much use was made of the Hawaiian stone knives for they are very rare. Knives of wood with inserts of shark teeth will be described in the chapter on Tools and Manufactures. They were less common on this group than on the Gilbert Islands. The more important cutting tools, adzes and axes I leave for the present to be considered later as perhaps the most finished product among Hawaiian stone implements.

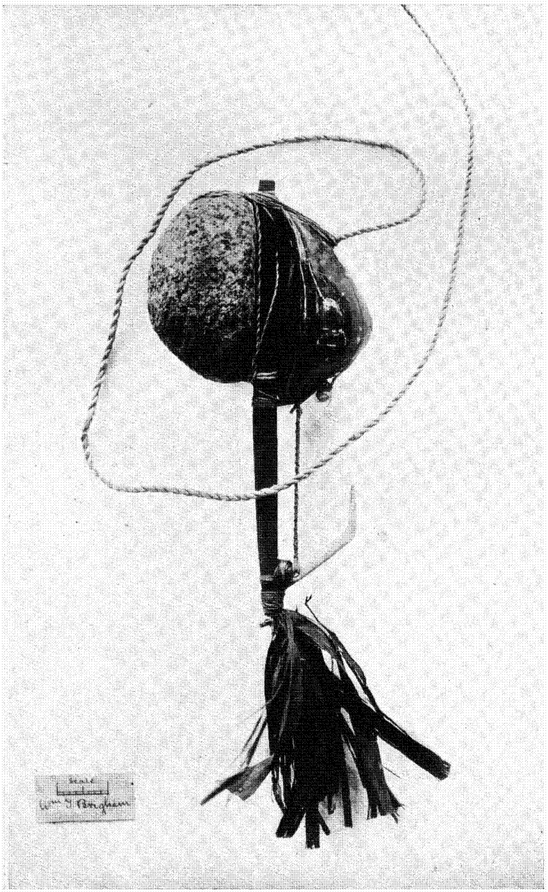

FIG. 14. HAWAIIAN SQUID-HOOK.

Clubs and Pestles.—Warfare and Peace. As with all primitive people these states were not long sundered in time or space, their symbols may be considered together. Clubs and pestles in Hawaii were often of very similar form, and whether a given example as No. 4798 in Plate XL., or better still No. 4657 in Fig. 23, was weapon or tool must be decided by the finish and the abrasion of the grinding end. I believe this latter specimen to be a club (*Newa*) both from the superior finish, unusual on a pestle, and from the absence of any sign of abrasion at the butt. It was a heavy effective weapon made of compact lava.

Another form of newa was free from any ambiguity. Formed of stone like the last, it had four wings or ridges at the head, and although this example (Plate XL., No. 4785) was not so carefully wrought as some, it was a favorite form and similar clubs of heavy kauila wood are in the Bishop Museum. What I believe to have been a later adaptation of this pattern has been described* by Charles H. Read, Esq., F. A. S., from the Vancouver collection in the British Museum. A stone head with four ridges is bound to a baton of kauila wood by cords of oloná. In the Bishop Museum are two heads of stone (Fig. 18) of which No. 4789 closely resembles the one in the Vancouver collection; it weighs 16 oz. The other, No. 4790, is barrel-shaped, 4.4 in. long, and weighs 19 oz. Four deep grooves receive the attaching cords and the base is slightly hollowed out to receive the end of the wooden handle. There is another head of much better finish in private hands in Honolulu, in which the attachment to the wood was facilitated by four knobs at the base. I have examined this through the kindness of a third party but have been unable to obtain either cast or photograph of the specimen which is said to have been found in the district of Kohala on Hawaii. It was brought to me for a name, and there may be other similar specimens

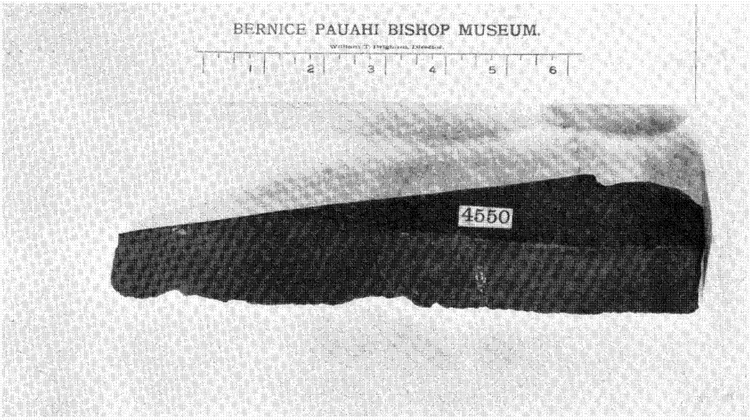

FIG. 15. HAWAIIAN STONE KNIFE.

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* Journal of the Anthropological Institute, XXI., p. 105, pl. x.

lying unknown and neglected in private hands. Those in the British Museum and those here figured from the Bishop Museum are the only specimens known in museums.

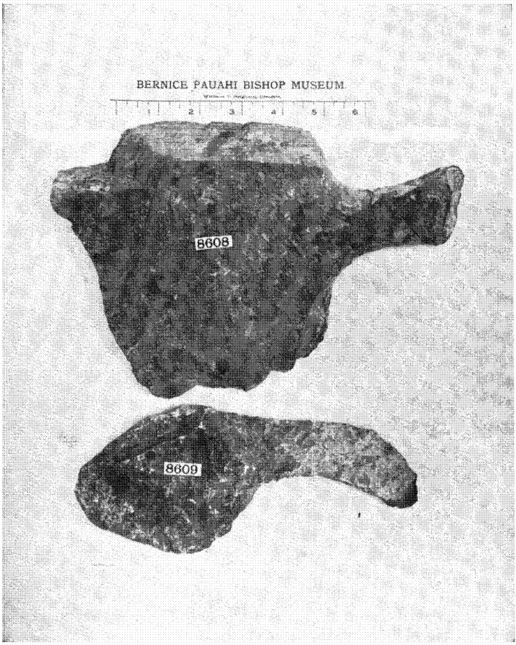

FIG. 16. MORIORI STONE FLENSING KNIVES.

On the same plate (XL.) is figured a club of far better finish than those hitherto attributed to the Hawaiians (No. 4786). It has, as can be seen on the plate, a smooth finish and no knob on the handle end, but instead is perforated by boring from each side. Through the bevelled hole thus formed a strong braided cord of oloná is passed, showing that besides its use as a common club the weapon could be hurled as a *bola* to entangle the legs of an adversary. This latter use was a favorite one among the Hawaiian warriors and in Fig. 19, No. 4788, is shown a stone cut with some art to effect the same end. Its section is flat and the distal end is broadened and thickened at the edges; there is a suitable knob by which to make fast the cord. To return to our club on Pl. XL. The section is not round but elliptical, connecting it with the flattened clubs called *mere* by the Maori who greatly prize them; indeed hey are often made of jade of considerable intrinsic value. The Bishop Museum possesses one of beautifully clear light green jade 17.2 inches long. Of this flattened form are the Moriori clubs shown in Plate LXII. which seem to show the original form afterwards more or less modified by their Maori successors into *patu* and *mere*.

Two other weapons, 4793 and 4794, are shown also on Fig. 19. These were grasped in the hand as a reinforcement and gave the fist a dangerous solidity. They could, according to other native authorities, be used as *bolas*. I have seen only these two which are quite distinct in material and finish.

Stone club heads are common enough in other groups, especially in the western Pacific where the Solomon islanders make very elaborate short clubs with a round unpierced stone head concealed within basket work. The wooden handle is often elaborately inlaid with pearl shell. The New Guinea men make the well-known spherical club heads fastened to the stick with gum in which are imbedded small shells or squares of pearl shell. Dr. Giglioli has described these clubs in a learned and complete essay.* The neighboring inhabitants of the Bismarck Archipelago make heads of various forms as shown in Fig. 20. The *golegole* (No. 1571) is rare, but the star-shaped forms are more common and show great care and patience on the part of the maker. It should be noted that this last form is now frequently imitated and with modern tools is not difficult to shape, but the finish will generally betray the work to the initiated. I do not think that this star form has any connection with the stone stars of the Peruvians described by Squier and others. The stone stars described by Whymper as common in Ecuador and figured by him† have no cylindrical body from which the star arms radiate as in the club heads of the western Pacific. None have more than six rays, and in some these rays are very short. In weight they vary from five to twenty ounces, and while the Ecuadorean stars may have been used as club heads (at least the heavier ones), it is quite as likely they were ornaments or symbols connected with star worship. The disk clubs of the New Caledonians belong to the same class and are usually made of jade, although this is sometimes of the coarsest grade.

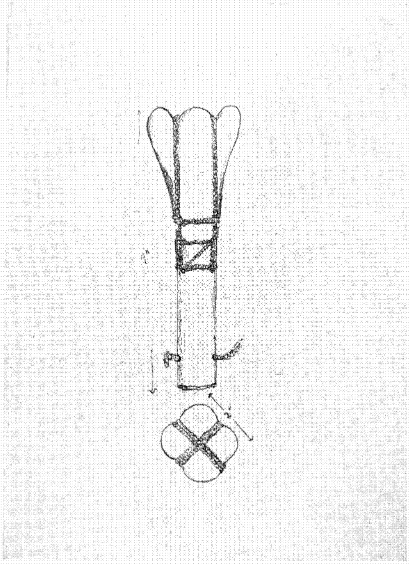

FIG. 17. COMPOUND HAWAIIAN CLUB.
From Read.

And here I may be permitted to digress so far as to mention the jade working of the Maori and New Caledonian. Greenstone is not found on the Hawaiian islands, hence the material was not described with the Hawaiian stones in the earlier part of this chapter, but in New Zealand, New Caledonia and New Guinea the products in the shape of adzes, clubs, amulets or ornaments are among the choicest of worked stone objects and are found in every museum.

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*Le Mazze con testa sferoidale di pietra della Nuova Brettagna, dette Palao. Prof. Enrico H. Giglioli, Archivio per L'Antropologia e la Etnologia, Vol. XXVII., p. 17. Firenze, 1897.

† Travels Amongst the Great Andes of the Equator, by Edward Whymper, p. 269.

The middle island of the New Zealand group has been sometimes named for the greenstone or *pounamu* found there, but the name properly belongs only to the quarries,—*Te wai pounamu*. Many grades of greenstone are worked, but the choice, delicately colored and somewhat translucent varieties usually called jade are the ones of present interest. These are very hard and fine-grained and lend themselves to careful and patient work as few other stones. Dr. A. B. Meyer the distinguished Director of the Dresden Museum has published* full information on the physical and chemical characteristics of this stone which in its varieties has many names as jade, jadeite, melanite, nephrite, greenstone, serpentine, chloro-melanite, etc. From Dr. Meyer's fine work I borrow three analyses (by Frenzel) to show the constant proportion of silica in specimens from different localities:—

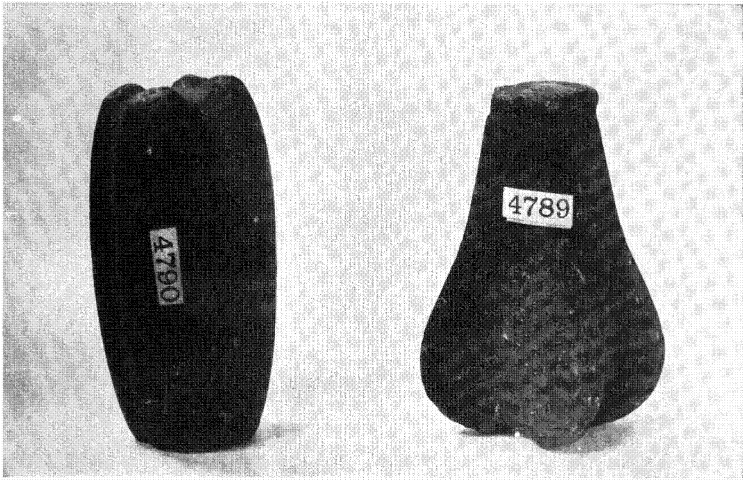

FIG. 18. HAWAIIAN CLUB HEADS.

	New Guinea Adze.	*New Zealand Adze.*	*New Caledonian Adze.*
Silica,	56.80	56.30	55.80
Alumina,	16.25	....	....
Iron oxide,	7.53	5.62	5.67
Manganese,	trace	....	....
Lime,	5.60	14.30	15.80
Magnesia,	3.13	21.95	20.54
Soda,	12.06	....	....
Water,	0.25	2.90	2.10
Sp. gr., 3.16	101.62	Sp. gr., 2.98 101.07	Sp. gr., 3.06 99.91

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*Jadeit—und Nephrit—Objecte. B. Asien, Oceanien und Africa. Königliches ethnographisches Museum zu Dresden. Leipzig, 1883.

In the second and third specimens lime and magnesia take the place of alumina and soda in the first, otherwise the body material silica and the coloring element iron oxide remain essentially the same.

In New Zealand the principal forms of the worked stone are *mere*, *hei-tiki*, *toki* or adze and ear ornaments; in New Guinea chiefly the adze, and in New Caledonia adze, disk-club and beads of a spherical or flattened form. Dr. Meyer gives illustrations of these in Plates V. and VI. of the work cited, and the Maori articles are well shown in a work by Hamilton.* So slow was the abrasion in the rude grinding that it is said to have taken more than a generation to finish a mere. The tools were blocks of sandstone rubbed slowly by hand, water dropping on the stone meanwhile. One form of ear ornament resembling a capital J in the type called Gothic was of peculiarly difficult workmanship. The odd-looking heitikis with one-sided heads were worked largely with drills and sand; they had drilled holes for suspension from the neck.

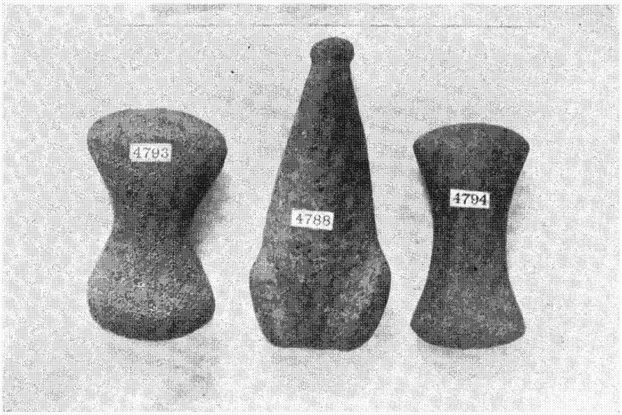

FIG. 19. HAWAIIAN STONE WEAPONS.

Of all these forms none seem closely related to the Hawaiian except certain clubs and pounders. I am in doubt whether to class a certain Hawaiian shell ornament in the Bishop Museum with the heitiki, but as it is an unique specimen I have decided to relegate it to the chapter on Ornament.

An antique form of Maori club is shown in Fig. 21 which both in material and shape recalls the Hawaiian pestle, but the handle end is in both examples ornamented with human heads, and one (No. 1514) has two rude masks on the body as well, while both have the butt more rounded than in the Hawaiian pestle. Of better workmanship

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* Maori Art, by A. Hamilton. New Zealand Institute, Wellington, N. Z.: 4to., Pls. XLV., XLVI.

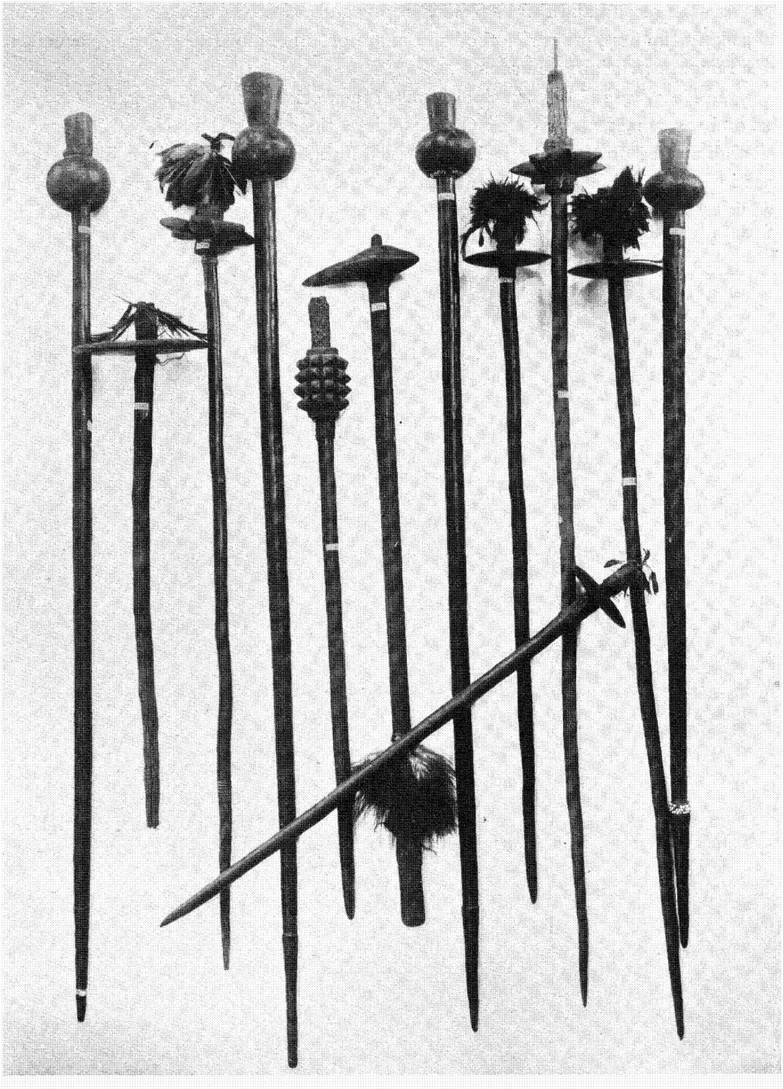

FIG. 20. CLUBS OF NEW GUINEA AND THE BISMARCK ARCHIPELAGO.

are the beaters shown in Fig. 22; both are of very dark greenstone and smoothly finished. The first, No. 1513, is a *paoi* or pestle to crush fern root, a process for which wooden pestles are more commonly used, and the other, No. 131, comes to the Bishop Museum labelled "Hand Club", but it certainly could have been used as a pestle, while its shortness (9.6 in.) would be inconvenient for a club.

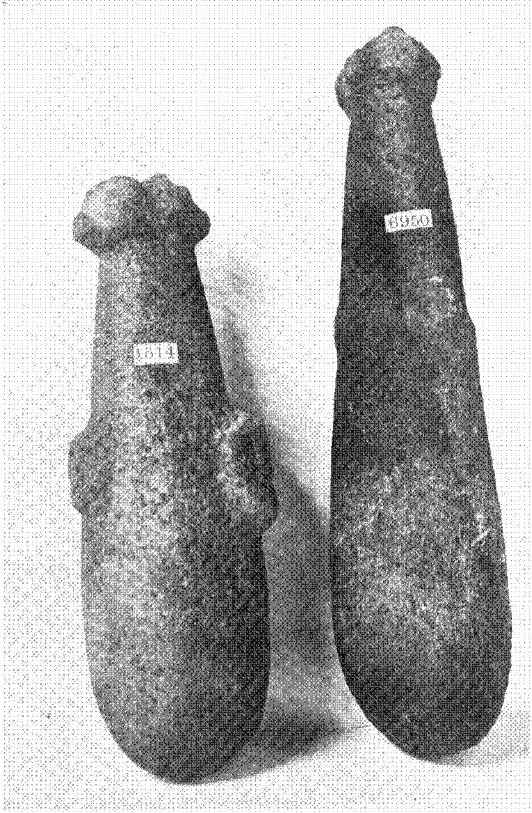

FIG. 21. ANCIENT MAORI CLUBS.

Pestles.—On the Hawaiian Group there was no corn to be ground so that we find neither the roller and *metate* of the Mexican nor the long pestle of the Amerind; nor did the Hawaiian grind the fern root which he usually baked, but he had the nut of the *Aleurites moluccana* or kukui and the kamani *Calophyllum inophyllum* to crush both for food and for the oil. Here also, unlike the custom of the southern islands, the awa (*Piper methysticum*) was ground, not chewed. The grinding of bait for fishes was always done with wooden pestles which will come properly under Fisheries.

As a general thing the Hawaiian pestle had no knob at the handle end, but some of good workmanship, shown in Plates XLI. and XLII., have definite bosses. In some cases the knob is replaced by depressions on opposite sides of the stem as may be seen in No. 7999 of Fig. 23. The rudest form, which I believe to be very ancient, is shown in No. 4483 of the same figure; it is simply a convenient pebble worn by use, and I have found it a suitable implement to crush kernels of nuts or the stems of medicinal plants. Where choice intervened the *kahuna lapaau* or aboriginal "medicine-man" always selected ivory or bone pestles for comminuting his drugs,—the material gave more power to the drug. Several ivory pounders are in the Bishop Museum as well as a medicine cup made from the vertebra of a small whale.

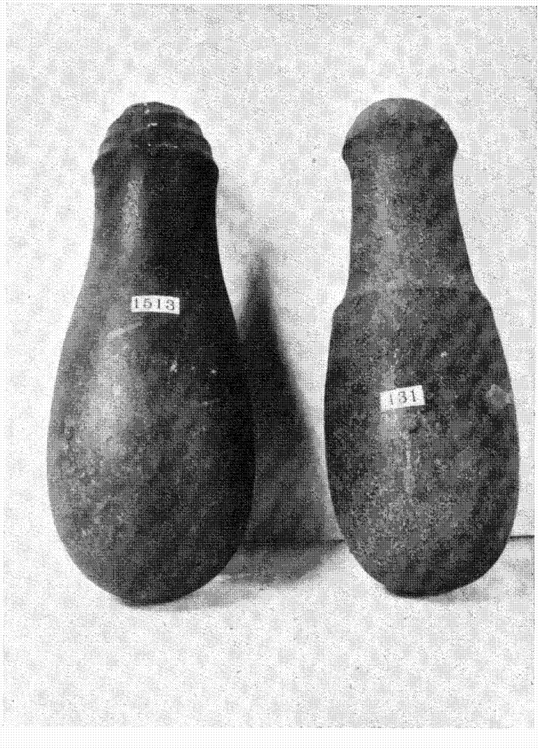

FIG. 22. MAORI PAOI (NO. 1513) AND CLUB (NO. 131).

Returning to Fig. 23, we have in No. 4660 another primitive pestle found in the ruins of an ancient heiau or temple. It is of hard cellular lava rudely wrought, but considerably worn by use. Next to it is a very choice specimen, No. 4657, which equals in the workmanship the best Maori specimens; are we to consider this the *newa* or hand club of some chief? I have already mentioned the difficulty encountered in attempting to distinguish between the weapon and the tool. The curious figure in the lower right hand corner, No. 7947, is what remains of a broken pestle which by the hand of a modern forger has been converted into the semblance of an ancient god. Too many such occur, and the Portuguese or Japanese stonecutters make many a dishonest dollar from the inexperienced collector of Hawaiian curiosities, and the native of the soil is not free from this cheat. So closely are genuine stone dishes or idols imitated that it is one of the most difficult matters to pass judgment upon, even for the few experts, and it is safer for the tyro to reject any specimen even if be disinterred before his eyes.

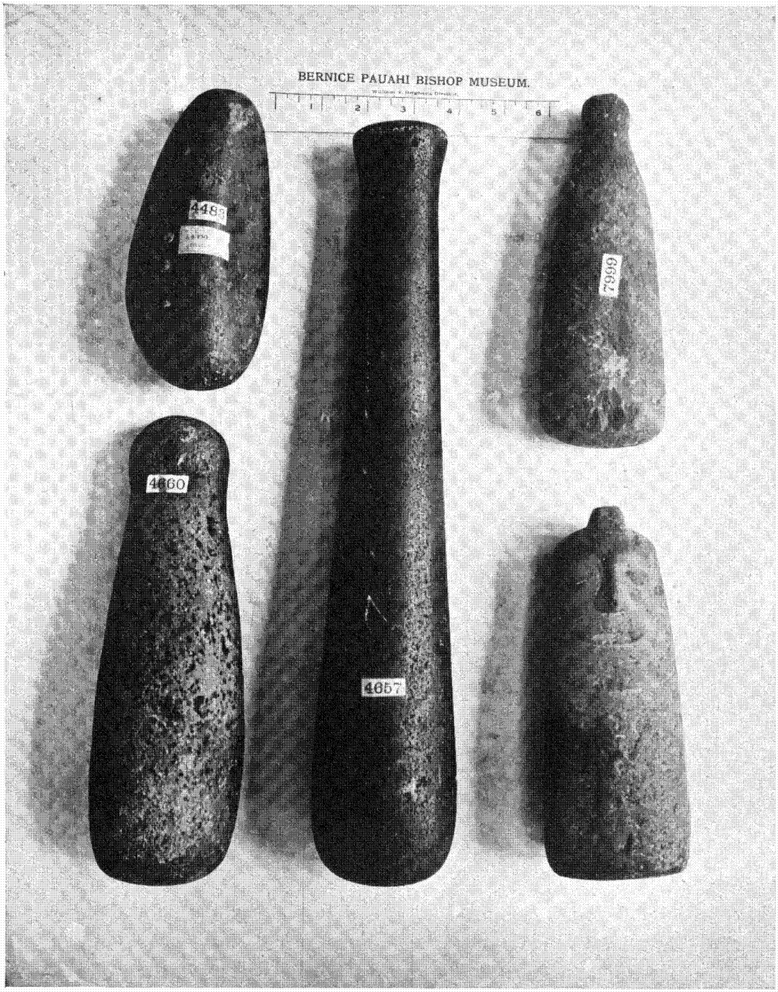
BERNICE PAUAHI BISHOP MUSEUM.
1
2
3
4
5
6
4483
4660
4657
7999

FIG. 23. HAWAIIAN PESTLES.

The pestles in Plates XLI. and XLII., also in Figs. 24 and 25 are fair examples of the Hawaiian form, and while in modern times certain ones are often designated "noni-pounders" I doubt there was any distinction in ancient times and the same stone ground kukui nuts for oil or the awa root for the hot and exhilarating drink or, yet again, noni (*Morinda citrifolia*) for dye or medicine. Some, as will be seen, are flattened at the butt, not always by long use; most, however, are rounded to fit more closely the bottom of the mortar.

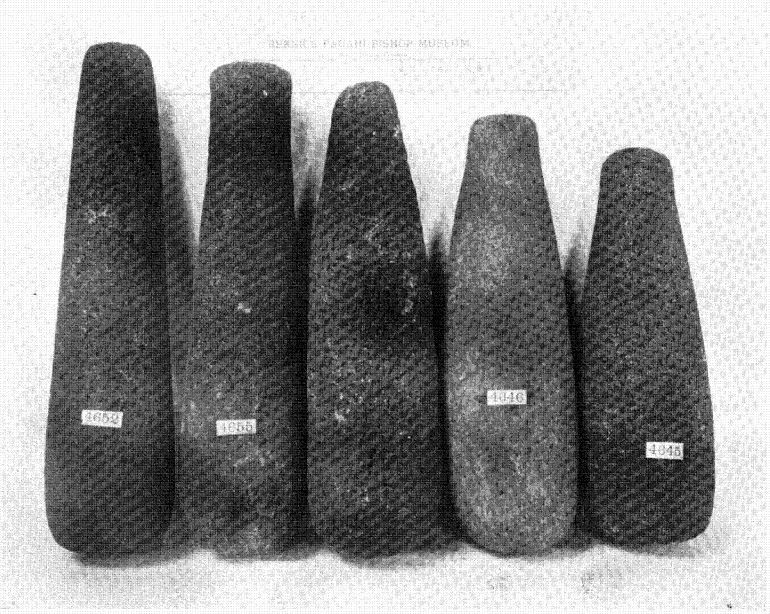

FIG. 24. HAWAIIAN PESTLES.

A much more common class of pestles was shorter, conical in shape, and held in the hand. These mullers, shown in Fig. 26, were generally used to pulverize charcoal or to grind ochres for paints, or to crush berries or succulent stems for dyes. Often no mortar was required but a shallow dish or a flat rock served as nether millstone. Older in point of development than the taller brethren, they serve as a transitional form to the *pohaku kui poi* or poi pounders, one of the most characteristic of Hawaiian stone implements and one that survives to this day without a rival in the hand manufacture of the national food.

Phallic Emblems.—The almost universal worship of the Phallus in early stages of human development extended to the tribes inhabiting the Pacific, and was prevalent among the Hawaiians. The worship is not to be considered here but the stone emblems of it must be noticed for some of them are liable to be mistaken for pestles. I have never found the curious nail which my friend Dr. Krämer describes from Samoa* but there are in the Bishop Museum many phallic objects of undoubted antiquity. The stone lamps offer many illustrations and the *pohaku eho* are sometimes found buried or otherwise hidden. In one case only have I seen the female element represented and in that *lingam* it appeared as a well wrought ring through which passed, but wholly detached, a conical stone similar to the larger of those shown in Plate LXXV. Many of the objects in this plate are well made and some are of great size as if intended to occupy a temple, and not merely a private sanctuary. In the Berlin Museum (Arning collection) is a male organ of such naturalistic treatment that I infer it was made in later times and not intended as an object of worship, for in all sacred phalli a very conventional treatment is shown. The images of the Hawaiian

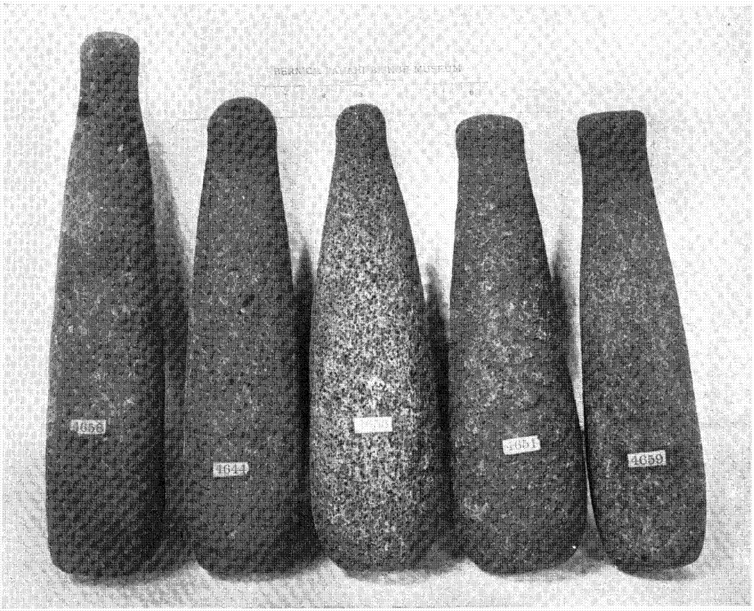

FIG. 25. HAWAIIAN PESTLES.

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* Der Steinnagel von Samoa, von Dr. Augustin Krämer. Globus Bd. LXXX., Nr. 1 (1901).

gods, especially those carved from wood are often obscene to an extreme only equalled in New Zealand among the Maori or in Japan.

Near Kalae on Molokai is a curious sculptured stone having at first glance the appearance of being waterworn. It is, however, on the top of a hill where no water could have done the work. I photographed it in 1889 (Fig. 27) and learned from the residents of the neighboring ranch that it was once the object of great veneration under the name of Kaulunanahoa. It has been carved to a great extent, but how much the natural conformation of the rock contributed to its present form cannot be told. Dr. Krämer has described* this also as phallic. It is in a region now depopulated but once with a large native population as the remains of temples and other structures indicate. In its present desolation and neglect, this once venerated stone is made the bearer of various names of tramps. It is as high as an ordinary man.

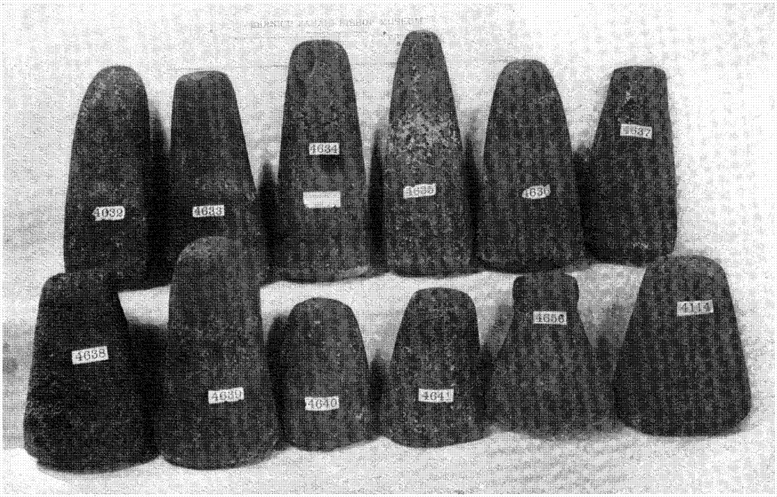

FIG. 26. HAWAIIAN STONE MULLERS.

Mortars.—Before following this line of form development we must turn back to fit the pestles with their mortars. I do not know of any pot holes in the rocks outside of torrent beds that were used for mortars as was so common among the Amerinds of New England.

The simplest mortar in the Bishop Museum is shown in Plate XLIII., No. 1227. It is 15 inches in its largest diameter and bears marks of considerable use. It seems to have been a small boulder or nodule of very cellular lava, and was rudely fashioned more by use than in the original intent. It is considered an awa mortar, because of its chief use, but would have been convenient for any trituration. Of similar form, but better workmanship, are the mortars shown in the lower group on the same plate. The last one of the group has actually been worn out by long use and the bottom has dropped away.* The middle one shows an approach to the more finished specimens we will next consider, and which show a remarkable degree of patient and understanding work. Both inside and out the finish is good, but within the shape is very perfect, being almost almond-shape in section. The five mortars shown in Fig. 28 were all found on the island of Kauai, hidden in the earth within the limits of the Kealia sugar plantation, and were turned up by the plow in cultivating for cane. Mr. George H. Dole was at the time manager of this plantation and added them to his private collection, most of which afterwards came to the Bishop Museum. The dimensions of these rare specimens, for I do not know of any similar in any of the museums, are as follows, in the order in which they are placed in the figure. Height and diameter in inches:—

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*Globus, Band LXXIII.

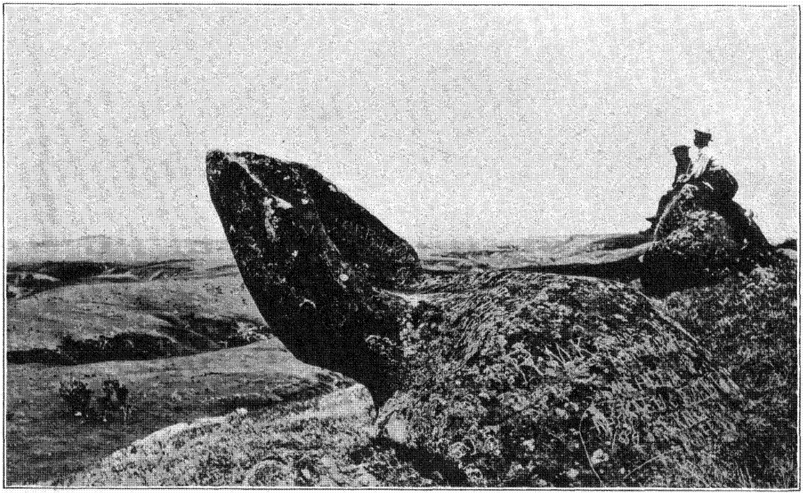

FIG. 27. KAULUNANAHOA ON MOLOKAI.

No. 1222, 13.5×6.2; 1224, 8.5×7.2; 1221, 7.2×7.2; 1223, 8×8; 1225, 11.5×7.

These were generally used for grinding kukui or kamani nuts for both oil and the relish called *inamona*. I have traced the place of their manufacture to a hill above

---

* It is not impossible that the bottom has been broken intentionally to prevent subsequent use.

Makaweli on Kauai where there are many fragments both of the lava used for mortars and the clinkstone of which adzes were shaped. To this factory I shall have occasion to revert when describing the adze making. What the exact process of manufacture was I do not know, nor can any of the old natives satisfy me. Certainly the method was not a perfect one for many failures are recorded unintentionally among the refuse heaps of this factory. One that I brought from there is shown in Fig. 29 and it will be seen that the sides were split off uniformly all round, a condition that is rather puzzling, for the bottom of the cup seems about finished, aud the accident must have occurred when the finishing touches were being applied. It can hardly have happened by a fall on to the stone ledge that crops out here and there within the limits of the workshop. There is the ruin and my readers may adopt such explanation as seems good. That the stone worker was often deceived in the quality of his selected stone is shown by the many failures after much work has been expended, but when the uncertain nature of volcanic rock is considered and its common want of homogeneity is known, it is not surprising. Many an experienced sculptor has been bitterly disappointed in his chosen block of Carrera marble and after much labor has come upon a hopeless flaw.

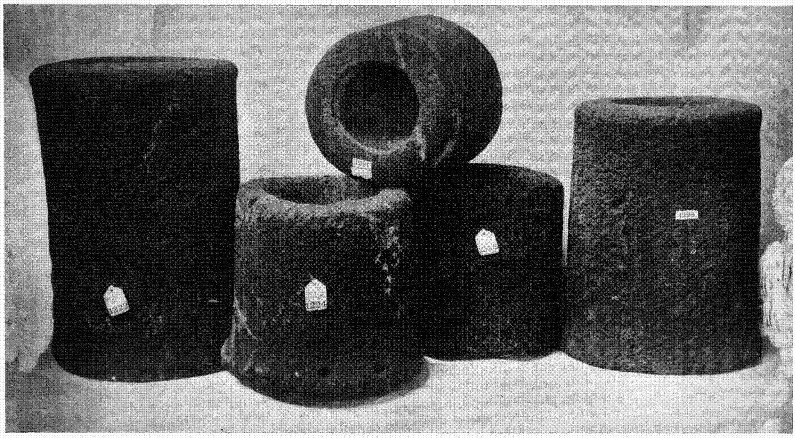

FIG. 28. HAWAIIAN STONE MORTARS.

The shallow cups or dishes to be used with the mullers are shown in Fig. 30. One (2979) is shown in reverse to exhibit the four legs. Most of the others are very shallow and were probably used for the paints for the impression of the bambu stamps on kapa; hence they are abundant, or at least their fragments are, for each kapa maker must have had at least three of these cups when printing. There is little variation in the form as they were objects of utility not ornament. The following table will give the length and weight of the Hawaiian stone pestles shown in the preceding figures:

Figure 23.

4483. Rude form, a mere pebble, which has been used considerably, 6.5 in. long, 2 lbs. 8 ozs.
4657. Most finished specimen in the collection, 15.5 in. long, 6 lbs. 2 ozs.
7999. Compact lava, 7.5 in. long, 2 lbs. 8 ozs.
4660. Cellular lava, 9.5 in. long, 4 lbs. 10 ozs.
7947. Compact lava; the broken pestle has been converted into an idol.

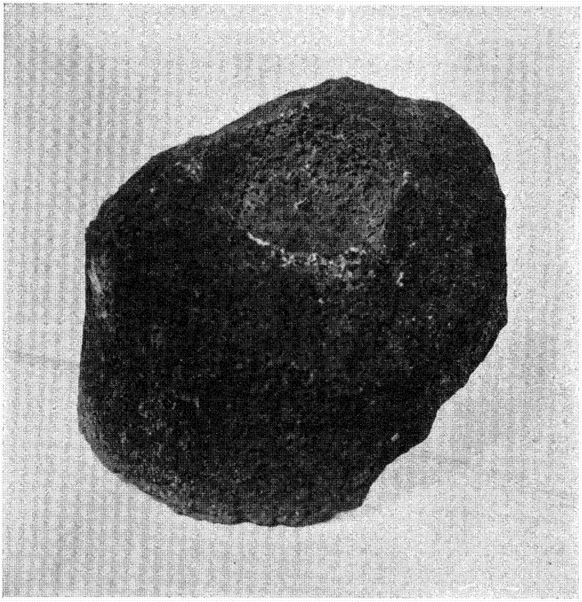

FIG. 29. MORTAR BROKEN IN MAKING.

Figure 24.

4652. Cellular lava, round, 12 in. long, weighs 4 lbs. 7 ozs.
4655. Cellular lava, 11.6 in. long, 3 lbs. 4 ozs.
7946. Cellular lava, 11.3 in. long, 5 lbs.
4646. Compact lava, 19.5 in. long, 5 lbs. 7 oz.
4645. Cellular lava, 9.5 in. long, 3 lbs. 12 ozs.

Figure 25.

4658. Very compact lava, scored on base, 13.7 in. long, weighs 5 lbs. 13 ozs.
4644. Compact lava flattened, 12 in., 5 lbs. 8 ozs.
4653. Cellular lava, four grooves on base, 11.9 in., 5 lbs. 8 ozs.
4651. Cellular lava, **W** cut on side, 11.5 in., 5 lbs. 3 ozs.
4659. Compact lava, round, 11.5 in., 5 lbs. 7 ozs.

FIGURE 26.

4632.	Compact lava, 6.2 in. long, 34.7 ozs.	4638.	Cellular lava, 5 in. long, 32 ozs.
4633.	Compact lava, 6.1 in. long, 42.5 ozs.	4639.	Compact, well made, 5.7 in. long, 47 ozs.
4634.	Compact lava, 6.7 in. long, 45 ozs.	4640.	Compact, 4 in. long, 23 ozs.
4635.	Compact lava, 7 in. long, 37.2 ozs.	4641.	Compact, 4 in. long, 23 ozs.
4636.	Compact lava, 6.1 in. long, 48 ozs.	4656.	Coarse lava, 4 in. long, 23 ozs.
4637.	Coral rock, 5.6 in. long, 28.5 ozs.	4114.	Elliptical section, 4.5 in. long, 46.7 ozs.

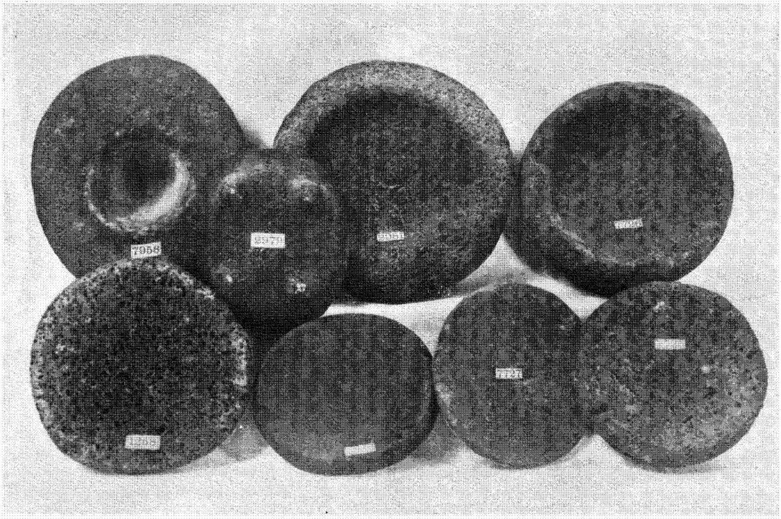

FIG. 30. STONE CUPS USED FOR GRINDING.

PLATE XLI.

4796.	Cellular lava, 13.2 in. long, 4 lbs. 2 ozs.	4798.	Cellular lava, 14.7 in. long, 6 lbs. 6 ozs.
4797.	Cellular lava, 15.8 in. long, 6 lbs. 9 ozs.	5148.	Cellular lava, 13.8 in. long, 4 lbs. 5 ozs.

PLATE XLII.

4649.	Cellular lava, 13 in. long, 5 lbs. 3 ozs.	4647.	Cellular lava, 12.7 in. long, 6 lbs.
4654.	Cellular lava, 12.5 in. long, 6 lbs. 8 ozs.	4650.	Cellular lava, 13.4 in. long, 6 lbs. 4 ozs.
5149.	Cellular lava, 11.7 in. long, 5 lbs. 2 ozs.		

Poi Pounders (*Na pohaku kui poi*).—We come now to an implement very prominently identified with Polynesian life: one that had its beginnings with the race and which will perhaps be the last of ancient things to fall from the hands of the dying people. Wherever the making of poi reached there were the stone pounders of one general pattern but with many local variations. Where breadfruit takes the place of kalo, as in some Micronesian islands, the edible substance is pounded with similar pestles of wood or stone. The root of the kalo (*Colocasia esculenta*) is cooked and then pounded on large wooden dishes, with no inconsiderable labor, into a tough and pasty dough which is then in turn diluted with water and allowed to sour as a paste. This is the favorite food among the Polynesians both young and old, and it seems to confute the popular idea that tropical peoples will not by choice do hard work. Certainly poi pounding was the hardest bread-making known among the nations, and the labor fell to the lot of the men alone.

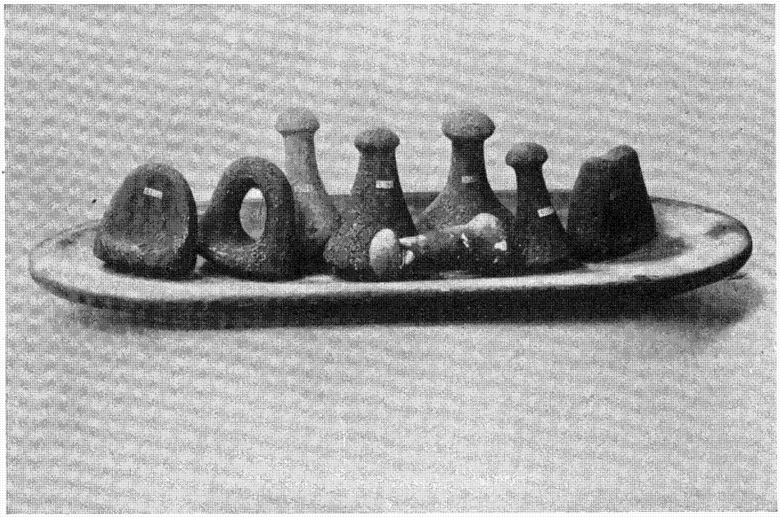

FIG. 31. HAWAIIAN POI BOARD AND POUNDERS.

But it is not so much the work done with these pounders, which will properly be considered in the chapter on Food, as the work expended in making them, and also the variation in forms that we are to study here. Every important group in Polynesia (using poi) had its own pattern, and as they have been somewhat mixed in museums and private collections, a very brief notice of these forms must be given here. The group with which in traditional times the Hawaiians had the closest connection through their long voyages, had a form quite distinct from any known to their visitors, and yet the Tahitian form is often attributed to the Hawaiian islands because the intercourse in the period when the whaling industry flourished in these waters brought many Tahitian things to Honolulu which became a point for their redistribution to the rest of the world. I have traced other Tahitian objects, which in the museums of Europe and America were called Hawaiian, to the fact that the Reverend William Ellis was a missionary in the Society islands until his health suffered, and on his way home to recuperate, he was persuaded to tarry in the Hawaiian islands and help the earliest band of missionaries sent by the American Board of Foreign Missions. His knowledge of the Tahitian dialect enabled him to converse with the closely related Hawaiian, and thus his help was invaluable to the teachers on Hawaii who were struggling to master the language of the people they had come to instruct. Mr. Ellis was more than an ordinary teacher as his most interesting *Tour of Hawaii* in 1821, and his various works on Madagascar prove, and he not only studied manners and customs but collected specimens of the manufactures of the peoples with whom he sojourned, and the collections brought through Hawaii from Tahiti and now in the British Museum mainly, were sometimes confounded with those that Mr. Ellis collected in Hawaii.

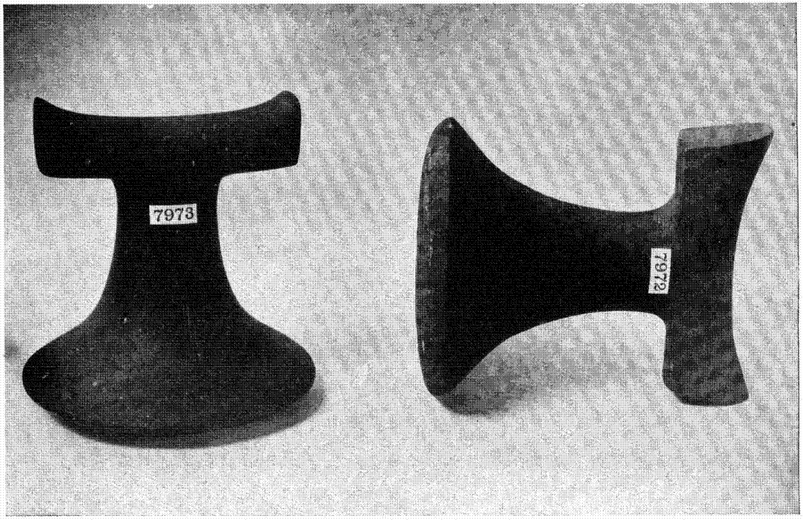

FIG. 32. TAHITIAN POI POUNDERS.

Evidently the Tahitians held their pounders in a different way to the Hawaiian bread-maker for the characteristic cross bar was the handle instead of the cylindrical stem of the pounder. While the cross bar was longer or shorter, and of differing curves, the specimens shown in Fig. 32 are good types of the southern form. Although the Marquesan group is much nearer the Society than the Hawaiian islands the pounder found there more resembles that used on the latter group, and was held in the same way.

Its distinguishing feature, on all the specimens that I have seen, was the small knob at the top which was either simply grooved (8004, 8005) or decorated with a head of the type common in Marquesan art. Both these forms are shown in Fig. 33, and the graceful curve of the stem should be noticed. The artistic outline is closer allied to the Tahitian than to the Hawaiian. A very ancient form of Marquesan pounder now in private hands in Honolulu is shown in Fig. 34. The double head is boldly modelled and the whole finish of the pounder is good. It perhaps favors my belief that the cannibals did better work, and had better taste, than the people who lived on poi and fish; but any one may form his own theory if he has specimens enough of the work of each division of the Pacific islanders to make a fair comparison. To me there is something very cannibalistic in the two faces on this pounder, and I am inclined to believe that the poi pounded with it was often as the bread to the more important meat.

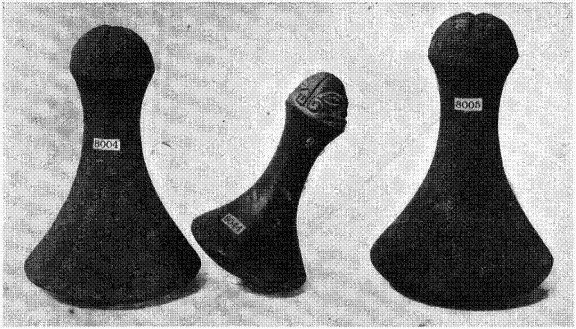

FIG. 33. MARQUESAN POI POUNDERS.

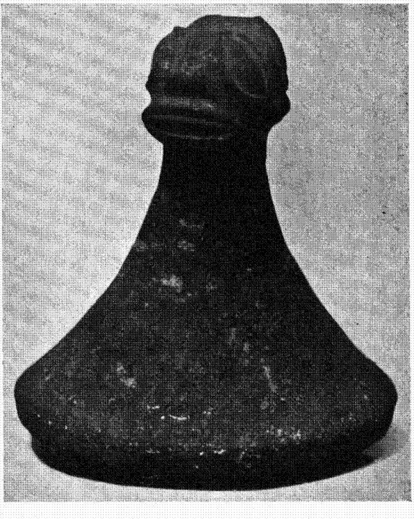

FIG. 34. ANCIENT MARQUESAN POI POUNDER.

The pounders used by the cannibals at the other end of the Pacific region, the Maori, have been already figured (Fig. 22, p. 28). The fern root and hinau berries (*Elæocarpus dentatus*) were generally beaten in a wooden bowl with a wooden pestle, neither of them having any connection with the Hawaiian poi board and pounder. Both the bowl and pestle were often carved in artistic forms as were so many of the humblest implements of the Maori.

Returning to the north Pacific we find in Micronesia a very distinct type of poi pounder. Both the cross bar and the boss have disappeared and a flattened disk terminates the stem otherwise quite like those of the Polynesian islanders already described. On many of the islands of Micronesia no stone is found; coral and coral sand form the solid land and it is common to see implements that on the volcanic islands are made of lava on these atolls made of compact shell, or in the case of pounders, of coral rock solid and ringing. Such are shown in Fig. 35 where the excellent workmanship of the cannibals and the peculiar discoidal top may be seen. One or two conical points are in some cases added apparently for ornament, or it may be to indicate an especial use, as the two specimens (3291, 3292) in the middle of the group have two points and are said to have been used for grinding *taik*, a red pigment greatly prized by the Ruk people.

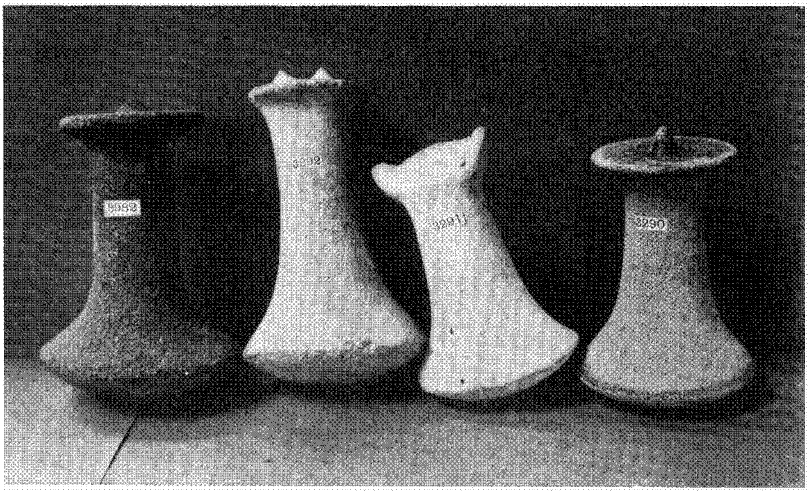

FIG. 35. CORAL ROCK POUNDERS FROM RUK.

Also from the Caroline islands are the two pounders shown in Fig. 36. One (7075) is of wood painted red like many of the Carolinean objects of the same material: the other is of very compact lava and well made. These are used for pounding both kalo and breadfruit.

I am not acquainted with any other form of importance outside the Hawaiian group, but on this group there was a variation in form greater than any of those already seen. However, we are getting on too fast and must return to the very primitive mullers from which have developed all these forms. Any one of the mullers shown in

Fig. 26 would do for poi pounding but they all lack weight and the face surface is not of sufficient diameter to do well the needed pounding. In Fig. 37 we have a conical muller made of coral rock (coral sand conglomerate) which is fairly heavy (4 lbs. 12 oz.), but while it would strike a forceful blow it would not be so easy on the recover, and in spite of the rather rough surface would be likely to slip from the hand. In this case the inventive genius of an intelligent people would soon devise the slender stem and knobbed top. I am able to show the intermediate shape when the stem had been diminished for the better clasping of the hand. Fig. 38 shows a very old muller or pounder found in the ruins of an old heiau or temple. It is roughly wrought and indicates an early age or little skill on the part of the maker. It almost gives the impression of a lump of clay being fashioned on the potter's wheel. It is the only one of this form I have seen.

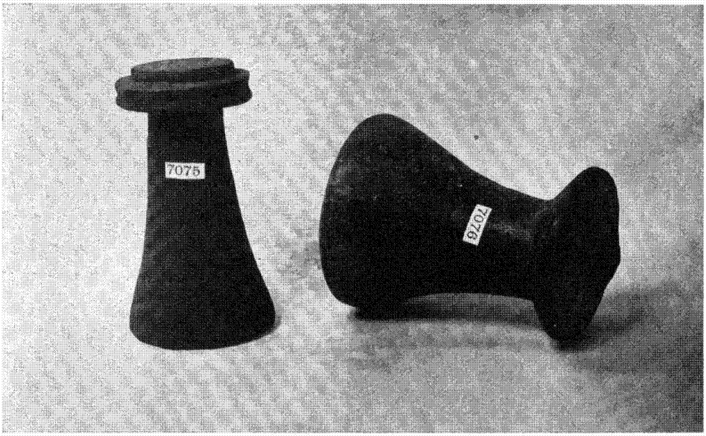

FIG. 36. WOOD AND STONE POUNDERS, CAROLINE ISLANDS.

Let not my reader suppose that I attach much importance to this development of the pounders; there is no chronological sequence so far as known, and while it is easy to arrange intermediate forms, it must be always remembered that we have nothing beyond our imagination to rest upon. We cannot prove that the simple form was not made long after the so-called intermediate for some special purpose. There are no bones of the cave bear or of any other extinct animal with which these stone tools have been found, and except tradition there is no possible help in dating any of the old specimens. Tradition seldom meddles with the common implements of vulgar life, and certainly does not in many of the ones which occupy our attention at present.

I am fortunately able to show how the Hawaiian poi pounder was made, and it is probable that this was the most ancient method. In Hilo in 1888 I found an old native at work with his son fashioning poi pounders for his neighbors and one of the photographs I then took is shown in Fig. 39. Sitting on the porch of his house on a mat (no longer Hawaiian but Chinese), clad in foreign clothes, father and son still retained the native posture and the native methods I had seen a quarter of a century before when a grass house and stone platform had served as background to a bronzed figure clad only in the unobtrusive *malo* or clout, working in the same way for the same end. Only a hard silicious pebble armed with perseverence and patience made products fairly shown in the plates and figures. Now it is said the modern pounders are often turned in a lathe,* and these substitutes are used by the Chinese to prepare the Hawaiian's national food!

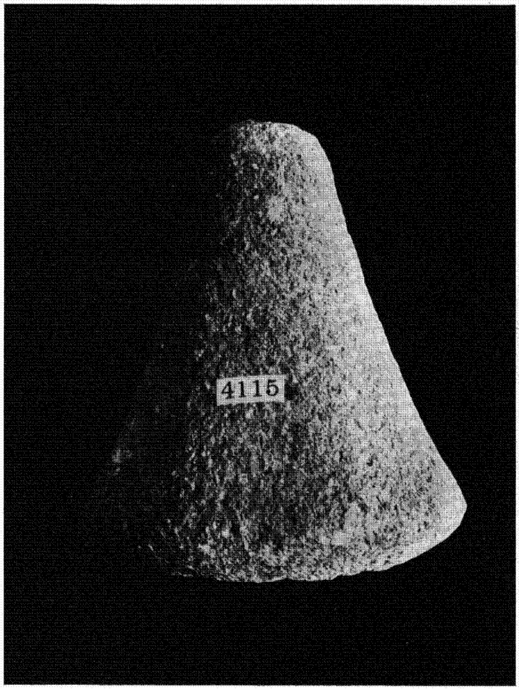

FIG. 37. HAWAIIAN MULLER OF CORAL ROCK.

Not seldom when much of the hard rough shaping is done the work must be abandoned because a flaw is discovered. Two such failures are shown in Fig. 40. The first (No. 8815) looks almost like a model of an eroded mountain for the hard pebble has cut away the stone much as the torrent washes out the valleys. The first stage was nearly finished. In the second example (No. 8043) more progress had been made: the concavity of the sides was marked and the face was nearly complete when the great crack from side to side appeared and the disappointed workman threw the block on to the refuse heap whence it found its way into a stone wall where the rejected stone was selected from the whole wall for the lesson it could teach.

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* I have recently seen tolerable poi pounders cut with a short-handled axe. It took nearly a day, and the result was rough.

I have wondered whether the Hawaiian priesthood was enough like other priesthoods to cling tenaciously to the use of ancient implements as well as forms. I have no information at first hand on the matter, for the priests had ceased to perform their functions, at least in public, before my day, but in the ruins of a temple on the slopes of the Kaala range on Oahu, were found by Messrs. Bryan and Seale of the Museum staff, several pounders of antique form two of which are shown in Fig. 41. No. 10,031 is made of a lava closely resembling stratified sandstone, and is considerably flattened. No. 10,032 is of a curiously shortened form. Both bear marks of long use. The *Alii* or Chiefs were particular about their poi pounders, carrying their own on journeys, and some of the *Moi* or Kings placed a kapu on their private pounders. In the Bishop Museum is the "sacred" pounder of the great Kamehameha, a small form easily carried on a journey or war-like expedition. It escaped being photographed as it was in the case with relics and not with the other more plebeian pounders. Under the circumstances the priests, who by this same kapu ruled the Kings, probably were equally particular about their own pounders.

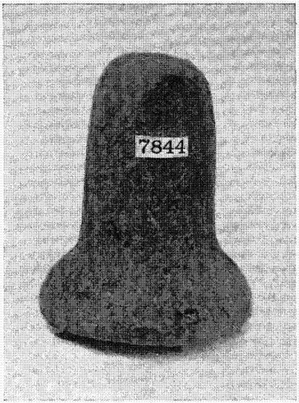

FIG. 38. ANCIENT HAWAIIAN POI POUNDER.

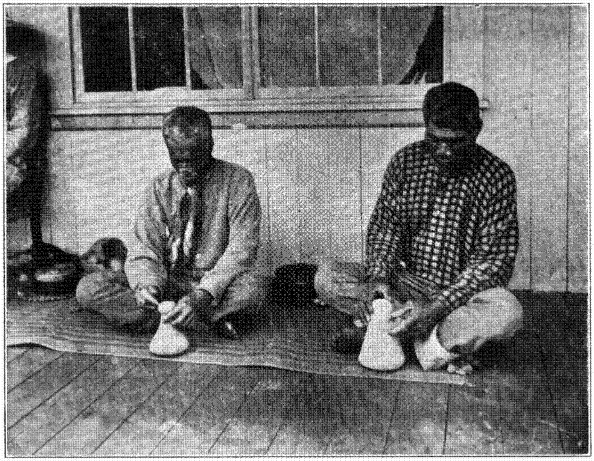

FIG. 39. HAWAIIANS MAKING POI POUNDERS.

Another native custom had its influence on the size if not the form of some pounders. The *maka ainana* or people, as distinguished from the chiefs and clergy, had neither any property nor any rights that their rulers were bound to respect.

Everything belonged to the King. The Hawaiian saying "*O luna, o lalo, kai, o uka a o ka hao pae, ko ke 'lii*" (All above, all below, the sea, the land, and iron cast upon the shore, all belong to the King) was so true that if a chief heard the noise of pounding poi, and was hungry, he could take the poi from the commoner to satisfy his own hunger even if he left the poor fellow starving. This was sufficiently common in practice to induce the making of pounders of smaller size that would not betray the preparation of food by the noise. *Na pohaku kui poi malu.* Such are several of the pounders shown in Figs. 43 and 44, and these lighter forms were the ones carried by the servants of a chief on a journey.

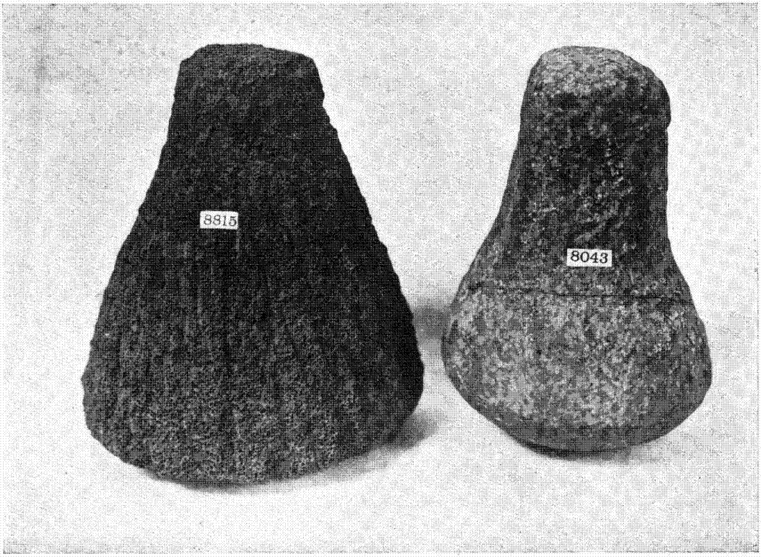

FIG. 40. UNFINISHED POI POUNDERS.

On the island Kauai are found two peculiar forms: one in its various modifications is shown in Plate XLIV.: the other in Plates XLV. and XLVI. Both of these forms are two-handed and the process is rather grinding than pounding. They were preferred for grinding the barks and berries used in dyeing kapa. The stirrup form may be regarded the older, certainly the easier to make, and the ring form (*pohaku kui puka* or *pohaku puka*) may have developed from this by wearing through the concavity. This ring form is found among the old corn grinders of Mexico, and so closely do these two remote implements resemble each other that I have seen in one of the principal ethnological museums of Europe a genuine Hawaiian ring poi pounder labeled as a Mexican corn grinder. Both are made of similar lava. In Plate XLIV. the unusual form shown at the extreme right of the group (No. 6820) is a cast kindly sent me by Professor Frederick W. Putnam, the distinguished Curator of the Peabody Museum of American Archæology at Cambridge, Mass., in whose charge is the unique original. It shows more elaborate design than any I have seen, although the projections on the upper corners, so convenient for the thumbs, are indicated on No. 4113 of the same plate. I have never seen these stirrup pounders in use. The ring pounders seem to have become obsolete in more recent times, perhaps because the Chinese, who pound much of the poi, prefer the common conical form of Fig. 42. The methods of holding the ring pounders, according as they are used for pounding (A) or grinding (B) is shown in Fig. 45. This was the usual, although the workmen doubtless varied the grip as their wrists became wearied, and different natives have shown me other methods as the only ones they ever knew. All such information is of little value.

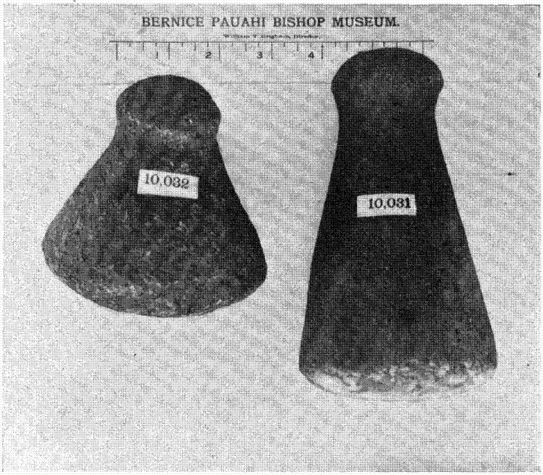

FIG. 41. ANCIENT HAWAIIAN POI POUNDERS.

The very limited range of these stirrup and ring pounders is noteworthy. The island Kauai was not remote from the rest of the group, nor were her inhabitants hostile generally. That intercourse was not so common as between the islands to the southeast is shown by the provincial forms of words, the use of the sound represented by k instead of that represented by t more generally on Kauai (a-Tooi of Cook) than on the other islands, and other dialectal peculiarities not necessary to discuss here. Notwithstanding there was a considerable intercourse and interchange of merchandise between the people of Kauai and even the distant Hawaii. Peculiar forms of kapa made only on the former island have been found buried in ancient caves in Kohala, Hawaii, but I do not remember that any poi pounders of the forms in question have ever been found on Hawaii. I am at a loss to explain the non-distribution and I cannot find that their use extended beyond the island of Kauai. When I first visited that island in 1864 they were already obsolete and were shown as curiosities.

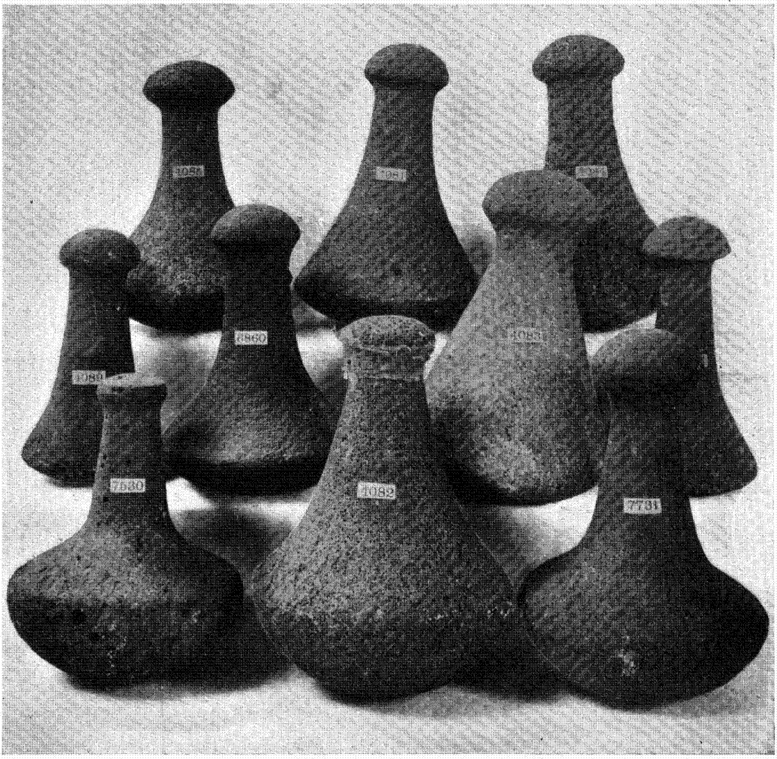

FIG. 42. HAWAIIAN POI POUNDERS.

That the reader may obtain a better idea of the size and weight of these "bread makers" I give here a list of those figured, with their weight, height and the diameter at the largest end.

FIGURE 42.

4085.	5 lbs. 8 oz., 8 in., 5.7 in.
4081.	5 lbs., 8.2 in., 5.5 in.
4084.	3 lbs. 4 oz., 8.5 in., 5.8 in.
4089.	2 lbs. 13 oz., 6.8 in., 3.7 in.
6860.	5 lbs. 4 oz., 8 in., 5.5 in.
4083.	9 lbs., 9 in., 5.6 in.
4093.	2 lbs. 13 oz., 7.2 in., 3.8 in.
7530.	6 lbs., 7.2 in., 5.7 in.
4082.	7 lbs. 10 oz., 8.8 in., 6.1 in.
7731.	6 lbs. 2 oz., 8.5 in. 5.9 in.

Figure 43.

4096. 4 lbs., 7.5 in., 4.7 in.
4097. 3 lbs. 3 oz., 6.2 in., 3.3 in.
4091. 4 lbs. 8 oz., 7.1 in., 5 in.
4092. 2 lbs. 1 oz., 6.5 in., 3.1 in.
4086. 4 lbs. 12 oz., 7 in., 5 in.
4099. 2 lbs. 5 oz., 6 in., 3.5 in.
4080. 6 lbs. 4 oz., 7.8 in., 5 in.
4106. 3 lbs. 12 oz., 7 in., 4.6 in.
4094. 3 lbs. 7 oz., 7.5 in., 4.4 in., coral.
4105. 2 lbs. 12 oz., 5.7 in., 4.2 in.
4103. 1 lb. 13 oz., 5.1 in., 3.1 in.
7736. 3 lbs. 14 oz., 7.6 in., 4.5 in., coral.
4088. 2 lbs. 14 oz., 6 in., 4.1 in.
4090. 5 lbs. 8 oz., 8.7 in., 5.9 in.
4079. 10 lbs. 9 oz., 10 in., 6.7 in.*

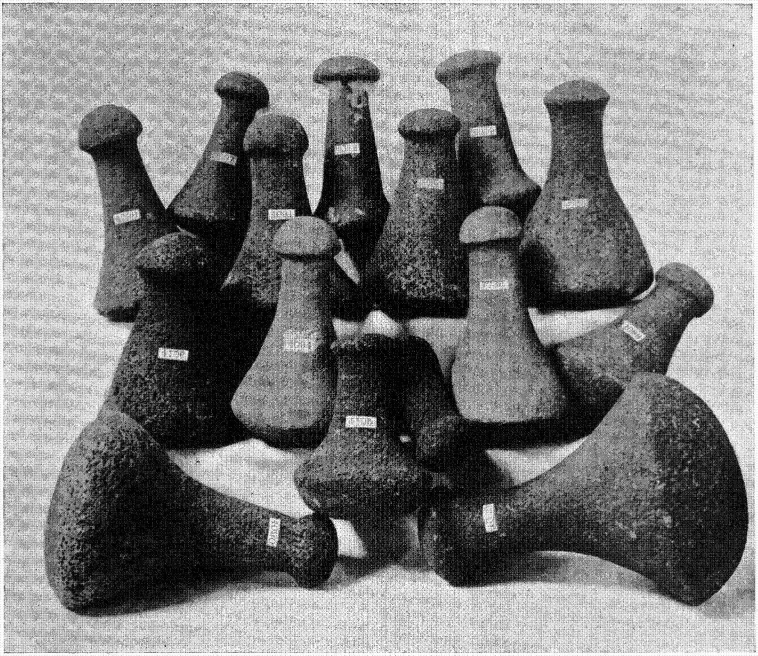

FIG. 43. HAWAIIAN POI POUNDERS.

Figure 44.

4087. 2 lbs. 14 oz., 6.6 in., 4.2 in.
4100. 1 lb. 12 oz., 5.1 in., 3.7 in.
4103. 1 lb. 13 oz., 5.2 in., 3.2 in.
4098. 2 lbs. 3 oz., 5 in., 3.8 in.
4095. 2 lbs., 5.6 in., 3.2 in.
4104. 1 lb. 8 oz., 5.5 in.
4241. 3 lbs. 10 oz., 4.1 in., 4.6 in.
4101. 2 lbs., 5.2 in., 3.5 in.

Plate XLIV.

4112. 4 lbs. 4 oz., 5.2 in., 4 in.
4113. 2 lbs. 5 oz., 4 in., 3.8 in.
4110. 3 lbs., 4.7 in., 3.5 in.
4108. 2 lbs. 1 oz., 4.5 in., 4.1 in.
4116. 2 lbs. 14 oz., 5 in., 4.1 in.
4109. 4 lbs. 5 oz., 5.2 in., 5 in.
6820.†

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*This is the largest specimen in the Bishop Museum, and the largest I have ever seen.

†This is a cast of the specimen in the Peabody Museum. I have not the weight of the original stone, but as my memory serves it is heavier than the average of the stirrup pounders.

In the ring poi pounders the abrading surface is elliptical, so in addition to the height, which is rather less than in the conical pounders, the major and minor diameters of the base are given, and as most all of the specimens are damaged on the periphery these diameters are given as nearly as possible as before the chipping took place. The methods of holding these pounders is shown in Fig. 45, where A shows the position for pounding, B the position for grinding.

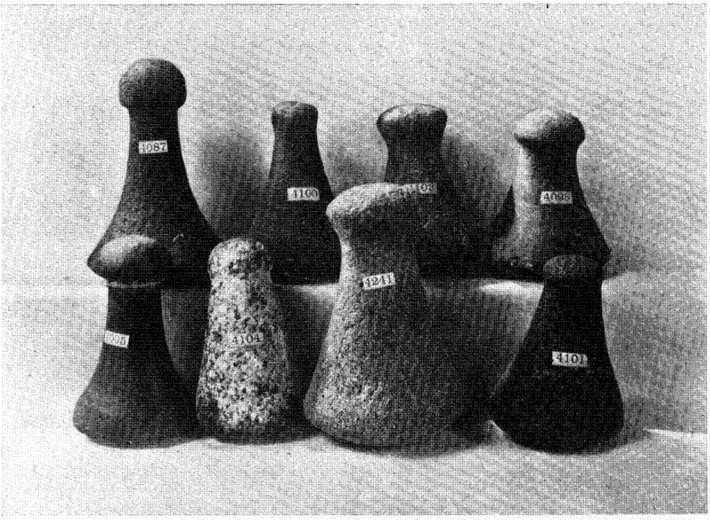


FIG. 44. HAWAIIAN POI POUNDERS.

PLATE XLV.

4120.	4 lbs. 10 oz., 6.2 in., 5.7×3.5 in.	4131.	4 lbs. 14 oz., 5.8 in., 6.4×3.5 in.
4132.	4 lbs. 2 oz., 6 in., 5.5×3.2 in.	4133.	5 lbs. 11 oz., 6 in., 6.6×4.6 in.
4138.	5 lbs. 6 oz., 5.9 in., 5.7×3.8 in..	4121.	3 lbs. 12 oz., 5.7 in., 6.4×4.2 in.
4126.	3 lbs. 3 oz., 5.5 in., 5.2×3.2 in.	4137.	3 lbs. 9 oz., 5.5 in., 6.1×3.8 in.
4130.	5 lbs., 6.4 in., 6.6×4 in.	4139.	3 lbs., 5.4 in., 6.2×3.4 in.

PLATE XLVI.

4129.	2 lbs. 10 oz., 5.2 in., 6.2×4 in.	4124.	2 lbs. 14 oz., 5.1 in., 5.5×3.2 in.
4128.	1 lb. 14 oz., 4.8 in., 5.2×2.3 in.	7954.	2 lbs. 1 oz., 5.1 in., 5.5×3.2 in.
8000.	3 lbs., 5 in., 5.2×3.2 in.	4134.	1 lb. 5 oz., 3.9 in., 4.1×2.7 in.
4119.	4 lbs., 5.9 in., 5.9×3.2 in.	4118.	4 lbs. 10 oz., 5.7 in., 6×3 in.
4122.	3 lbs. 8 oz., 5.4 in., 5.7×3.2 in.	4239.	2 lbs. 15 oz., 5.5 in., 6×3.1 in.
4127.	4 lbs., 5.1 in., 5.9×3.4 in.	4123.	3 lbs. 10 oz., 5.5 in., 6.1×4 in.
4125.	3 lbs., 5.1 in., 5.4×3.7 in.	7955.	3 lbs. 14 oz., 5.2 in., 6.7×3.9 in.

From these last tables it will be seen that the ring pounders are lighter than the others.

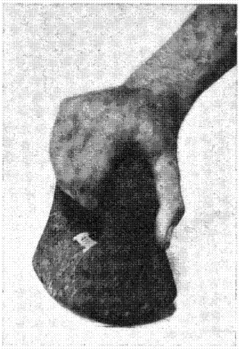


FIG. 45A.

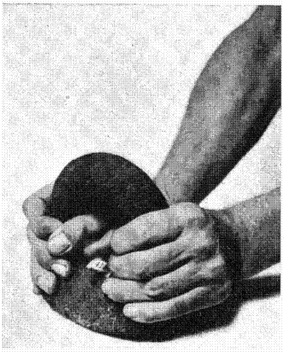


FIG. 45B.

The two pounders shown in Fig. 46 are of unknown use. No. 4140 is flat with a slightly thicker grinding edge which shows signs of use. The upper part seems fitted for some sort of handle; certainly it could not conveniently be held in the hands from its small size (only 4.6 in. high). Natives have been unwilling or unable to give any information about it; to those I have questioned it is evidently a *res ignota*. I may add that it was dug up on Kauai, that island of odd pounders. The other pounder (4135) conveys to me the impression of a stirrup pounder partly converted into a ring pounder. As may be seen in the illustration it has convenient notches for thumbs on top and the perforation is rough and unfinished. This also has been used, perhaps before the alteration. A harder enigma is presented

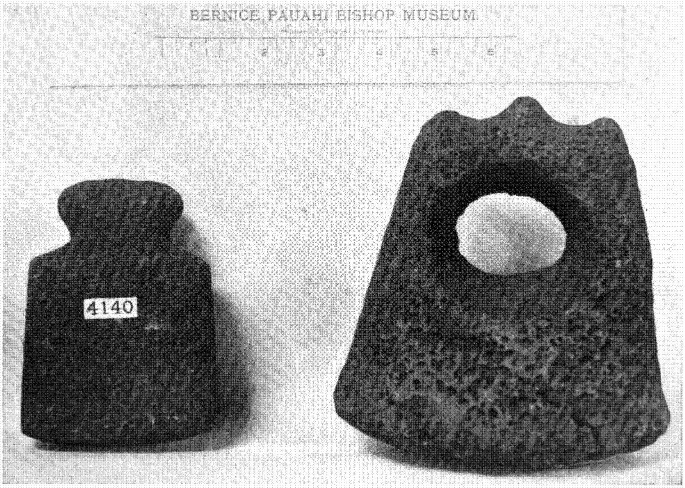


FIG. 46. STONE POUNDERS. 4135

in Fig. 47. Is the worked stone a pounder? Why the great labor expended on the very peculiar form? I confess that I cannot answer these questions with any satisfaction, nor does the little known history of the stone help in the least; it only indicates a native belief in its antiquity. The story is otherwise a curious one. In 1895 a native kahuna or priest was making offerings to a modern stone idol, for an important object which I am requested not to mention. He had spread the mat for the oblation, covering it with red cotton cloth (Turkey red), the color used in idol worship, and upon this was placed the stone god flanked by a bottle of whiskey and one of gin. Fresh fern leaves and dried awa root were before the god, and as the incantation requires some link to the ancient times, the older the more efficacious, this stone implement (No. 7660), treasured long in the family of the priest, was placed in one corner of the sacred mat; a large smooth pebble, *Ulu a Lewalu*, regarded as of divine nature (a sort of *aumakua*), was placed opposite, while between these venerable assistants were strewed *imitations* of old fish hooks, leiomano, etc. The god forsooth was not expected to detect these forgeries! The kahuna, divested of his ordinary clothes, donned a small triangular silk apron, and during the rites fell dead. The people in the house not being accomplices in these heathen proceedings, were yet unwilling to have the unhallowed machinery under their roof and sent the whole outfit (including the gin and whiskey bottles *empty*, also fern leaves and awa unwithered) to

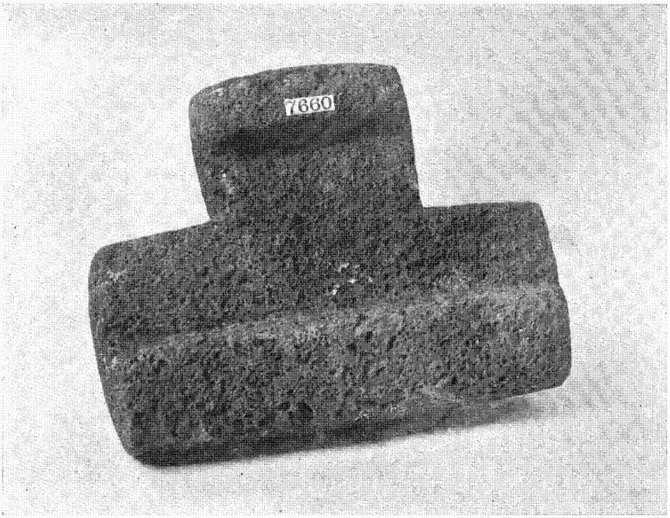


FIG. 47. HAWAIIAN STONE IMPLEMENT.

the Bishop Museum where it is now on exhibition. Now in the opinion of this kahuna, who was a fairly intelligent native, the stone was of sufficient antiquity to have become sacred, to have acquired a certain *mana* or divine power, although I do not believe he could have explained its original use.

Kapa Pressers.—A form allied to the ring pounders, or even more to the Mexican corn grinders already mentioned, and one sometimes confounded with the former by collectors, is that shown in Fig. 48. The three rather clumsily wrought stones were used for pressing the moist kapa or bark cloth. I have never seen them used, and certainly they were not a necessary part of the clothmaker's machinery for they are rare and doubtless were generally replaced by smooth stones or blocks of wood.

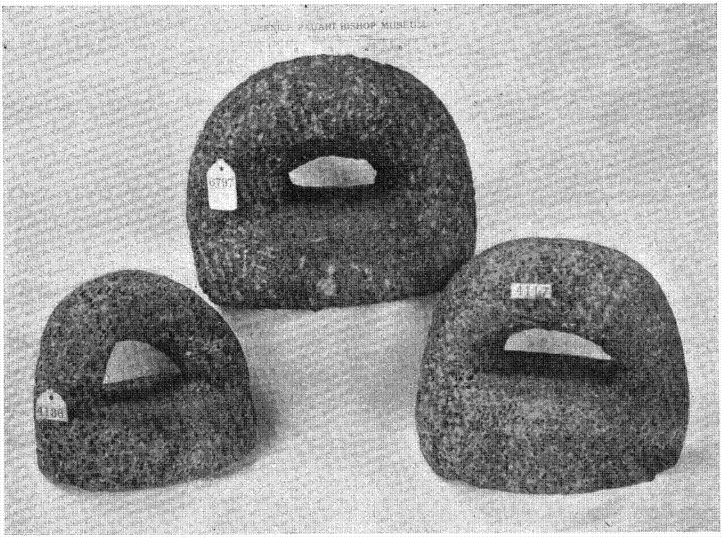


FIG. 48. KAPA PRESSERS.

Stone Dishes.—While for ordinary dishes wood was the more suitable material, and in the chapter on Household Utensils it will be seen that the Hawaiians had large bowls (*Umeke*) and flat dishes of suitable size and form for dog or fish, they also made use of stone dishes and in the Bishop Museum are several such dishes and bowls that will here be figured and described.

We have the rudest form of platter, at first sight almost a mere beach pebble worn by the waves but not cut by human hand, but close examination shows some shaping and also use. The bottom is much rougher than the top which is shown in Fig. 49. If it is to be considered a worked stone certainly a modicum of labor was expended by the maker. Its use may be surmised from what we know of the few other stone dishes that remain. Before some shapeless idol in some one of the many *heiau* erected to the god of this or that *hui* or company of fishermen on some prominent cliff overlooking the fishing ground, this stone was perhaps the platter for the offering of fish which was to decay rapidly before the unsmelling nostrils of the fish god. In those bleak and storm-swept places wood would not last long.

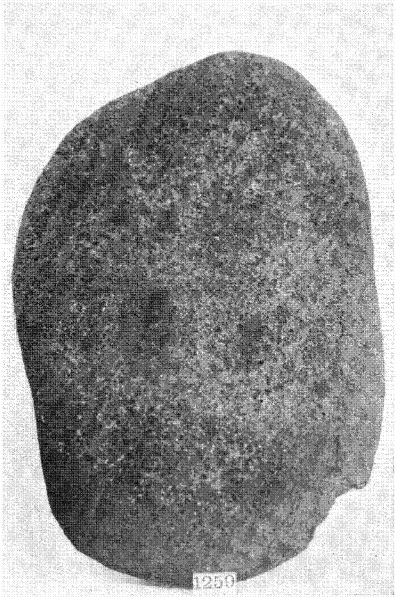


FIG. 49. HAWAIIAN STONE DISH.

A well-finished bowl of sandstone comes next and presents several peculiarities. The thick upper edge is perfectly flat and the bottom spherical with a sort of "punty" mark as if a knob had been broken from its centre. If found elsewhere it might pass for the cover of a cinerary urn. It was found built into a dry stone wall at some distance from recent habitations. Altogether it does not possess a common Hawaiian physiognomy. The material is a homogeneous coral sandstone from Oahu, quite the same that many poi pounders were made from. It is slightly chipped on one edge. Fig. 50, No. 1257. In Fig. 51 we have a distinct dish (8580), rude indeed but definitely a dish, and as it was discovered on Molokai in a temple, and as tradition locally vouched for its original use, we need not hesitate to class this with the vessels of the sanctuary. It held the smaller offerings and is of compact lava about twenty inches in diameter. In the chapter on Worship the use of these stone receptacles will be fully discussed; here it is only necessary to show that the Hawaiians made them. A more definite temple dish, if dish it should be called, is shown in Fig. 52 (No. 6796). It was found on Molokai and is well known to be the offertorium of a rude stone fish-god which is with it in the Bishop Museum. Its form is peculiar in that it is very thick (6 in.) in proportion to its diameter and has a projecting band around most of its circumference interrupted only by the handle-like projection on which the idol rested. The greatest diameter including this band is 13 in., the least 10.5 in.

Stone Bowls. — We come now to two pots or bowls differing in shape but having this in common that they were both found on uninhabited bird-islands of the Hawaiian group, where their use was probably identical although we do not know what that was. The first one, Fig. 53, No. 7449, was found on Necker island with the curious stone images described below and figured in Pl. LXII. It is so whitened with guano that it resembles concrete. Originally 8 in. high and 7.8 in. in diameter, the upper rim has been broken away and there is a small hole broken in the bottom. The inside diameter is 6.5 in., so the wall is very thin. The shape is unlike any other Hawaiian vessel known to me. It is well suited for a container, the walls being too thin for a mortar. With the images it was given to the Bishop Museum by Hon. Geo. N. Wilcox. The other bowl (No. 5593) presents an elliptical section (7.5×6 in.) and is 6.7 in. high: it weighs 8.2 lbs. It has even thinner walls and has a considerable piece

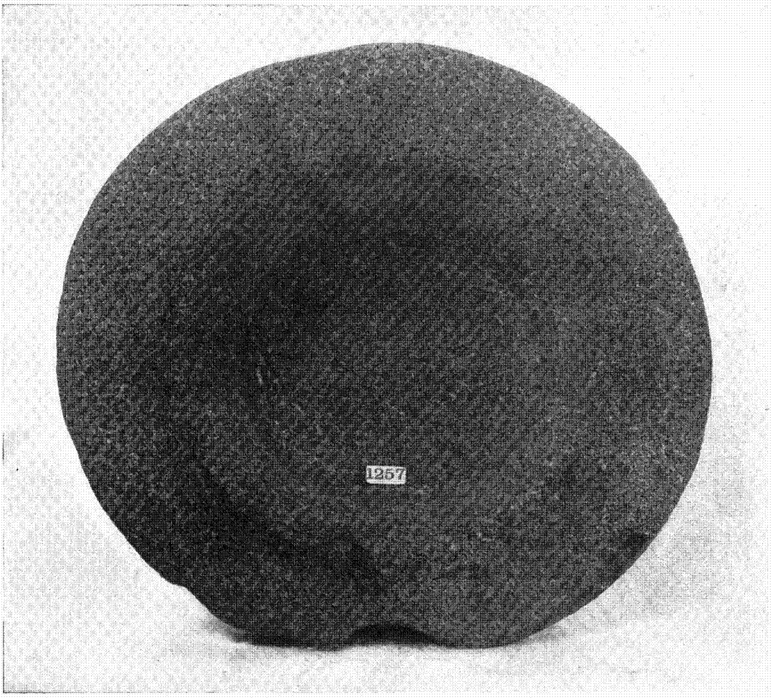


FIG. 50. HAWAIIAN DISH OF CORAL SANDSTONE.

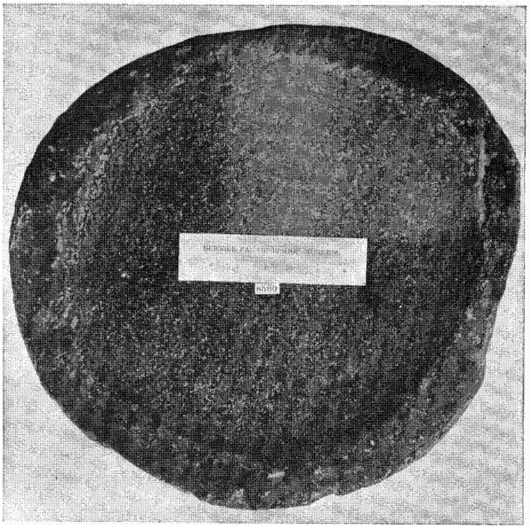


FIG. 51. HAWAIIAN STONE DISH.

broken from the bottom so that like the former it has become useless for a container and was perhaps abandoned by the last owner. It was found on Nihoa or Bird island in 1885 and was given to the Museum by Mrs. Dominis (later Queen Liliuokalani). I simply do not know what these bowls were used for, and it would be idle to conjecture without farther information. Both of these islands, the least distant Nihoa out of sight from the nearest island Kauai, were visited in former days by Hawaiians for feather gathering and fishing, and the remains of stone enclosures evidently for purposes of worship are abundant on Necker. It was apparently a Holy Island. On neither island are there permanent springs of water, and if there were they would be contaminated by the guano of the innumerable birds that frequent these rocky islets for nesting. The visitors did not reside on either island longer than necessary to collect feathers (of the tropic and frigate birds) and the landing was precarious. That there were so many stone images on Necker island is surprising for it is a narrow ridge of an ancient crater with steep

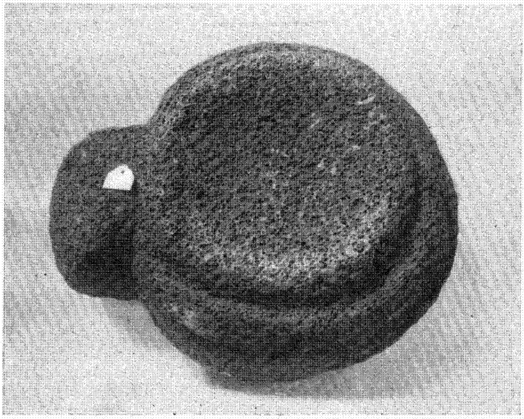


FIG. 52. STONE OFFERTORIUM FROM MOLOKAI.

sides to the sea and the stone enclosures occupy much of the level ground. In these were placed the images, and where the human visitors lived while there I do not see. On Nihoa, which is larger and more fertile (there is no vegetation on Necker island except scant grass and a few low, half-starved shrubs), there are stone enclosures, perhaps heiau, but I have not seen them, and no images have been found. Still the latter island has not been worked over so thoroughly as Necker island. As the fishermen had to go a long distance in canoes they would hardly from choice take a rare form of stone dish to contain provisions when their wooden umeke were lighter and more capacious.

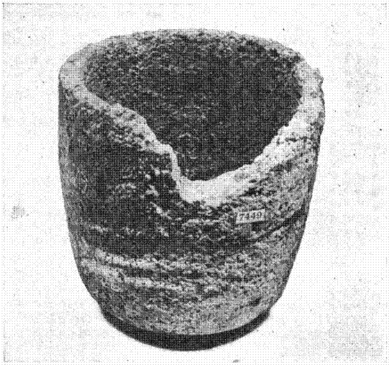


FIG. 53. STONE BOWL FROM NECKER ISLAND.

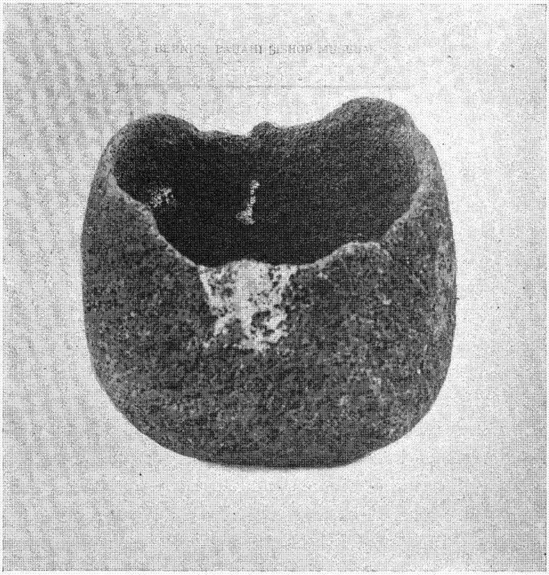


FIG. 54. STONE BOWL FROM NIHOA ISLAND.

Still another stone dish is in the Museum and from its form it might also be a dish for idol offerings, but the handle at one end and the knob at the other are not unlike some wooden dishes in use for fish, etc. The workmanship seems modern and it is quite possible that this is the poor work of some Portuguese or Japanese imitator. It is shown in Fig. 55. The extreme length is 12.5 in.

Stone Cups.—I would now call attention to the most common of Hawaiian stone vessels, the cups or saucers, which present every state of elaboration. They are found all over the group, some of them of considerable antiquity, and they were used by the fishermen to prepare bait (*palu*), by the tatuer to hold his ink, by the kapa printer to hold her dyes, and by man, woman and child for the innumerable purposes for which such a container is convenient, especially in a civilization where the differentiation of dishes has not attained the stage of modern housekeeping.

In Fig. 56 I have placed some typical forms of these cups from the most finished (No. 2974) to the roughest (No. 7760); the form with thick lips that could be used as a lamp (No. 3568) and the fanciful form (No. 3569) that might serve as cup to No. 2974 as saucer. It is seldom that these cups when dug up betray any definite marks of their former use, but sometimes the dye is still permeating the porous stone, and in others the burned oil is clearly in evidence. Although most of these cups have long since been discarded for the more convenient products of foreign make, not infrequently an old fisherman attributes greater efficacy to the ancient cup, and I have seen bait mixed carefully in a treasured relic of his predecessors.

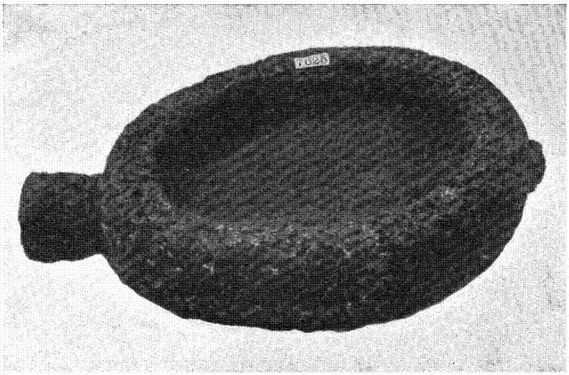


FIG. 55. HAWAIIAN STONE DISH.

Referring to Pl. XLVII. where many of these cups are shown, No. 1229 is certainly a dye cup and No. 7728 is undoubtedly a lamp, while the others may have been used for anything. The lefthand specimen in the middle row (7925) closely recalls those stone club heads from New Britain, but in this case the boring has been effected on one side only; the outer surface is that of a smooth oblate spheroid. Some are so rude as to seem mere pebbles with a slight depression pecked on a flat surface; in others the boring of the cup was done by a pestle-like pebble with sand and water.

In Fig. 57 is presented a series of well-finished cups all of one general pattern. The obverse has always a flat, well-ground, edge; the reverse is sometimes hemispherical and sometimes bell-shaped. They, like their plebeian relatives shown in Pl. XLVII. might be used in many ways, but two of the many were so peculiar as to merit a more detailed description. They in this way have place both in Worship and Amusements and in the chapters devoted to those subjects will again appear, but here we must say that in the dance (*hula*) these stone cups were used to make disgusting noises by pressing the wetted edges suddenly against some soft part of the body,—an effect especially pleasing to the Polynesian race and produced by the Samoans in the *siva* dance by placing the hand in the opposite armpit. It is probably to this curious use that we must attribute their application in the rude surgery of the Hawaiian *kahuna lapaau* as blistering cups. The other use was far more weird, and in spite of their peaceable and harmless appearance they must be placed in the category of deadly weapons.

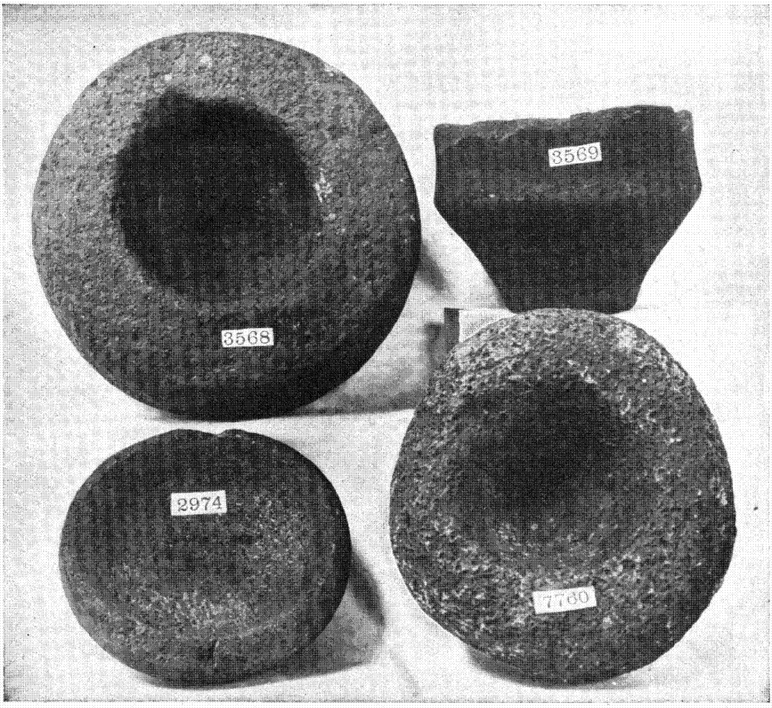


FIG. 56. HAWAIIAN STONE CUPS.

Perhaps in the quiet little row shown in Fig. 57 there is not a cup that has not caused the death of one or more Hawaiians. The strange process of "praying to death, *pule anaana*" will be fully described in a later chapter, but in one of the methods it sufficed to collect a few hairs, nail parings or some spittle of the intended victim, burn these *exuviæ* with suitable prayers in the innocent-looking cup (*kapuahi kuni anaana*) and then scatter the ashes in the water he was accustomed to drink. If this last part was impracticable, the kahuna anaana performed the previous part of the rite and then took care to have his quarry informed that his soul had been consumed. Convinced of this, the credulous victim took to his mat, wasted away and died. So fixed was the belief in this bewitching process among all classes of the Hawaiians that the utmost precautions were taken to secure from any possible enemy these rejected bodily parts even of the highest chiefs, who indeed would have the most enemies.

The material in all cases, except No. 942, which is of coral sandstone, is a brown compact lava closely allied to clinkstone, and one would incline to the belief that they all came from the same place; evidently the same pattern has been used. The more prosaic uses of these fine cups my readers may imagine for themselves. It may be of interest to some to know the size of the Hawaiian stone cups, and as the usual scale has been purposely omitted, the diameters are tabulated below. As on some of the figures the numbers do not show, the measurements are given in their order beginning with Fig. 56.

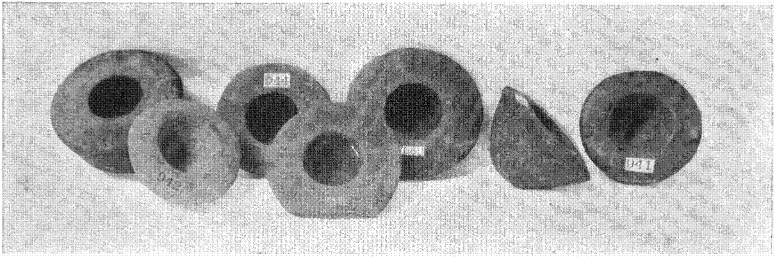


FIG. 57. KAPUAHI KUNI ANAANA.

FIGURE 56.

3568. 6.6 in.	3569. 4.6 in.	2974. 4.7 in.	7760. 5.9 in.

PLATE XLVII.

5163. 6.1 in.	5164. 3.1 in.	5161. 3.0 in.	1229. 6.1 in.	7925. 4.4 9°.
7926. 3.5 in.	7927. 3.5 in.	7928. 3.6 in.	7728. 3.4 in.	5162. 3.5.
7929. 2.9 in.	7930. 3.0 in.	7931. 2.9 in.		

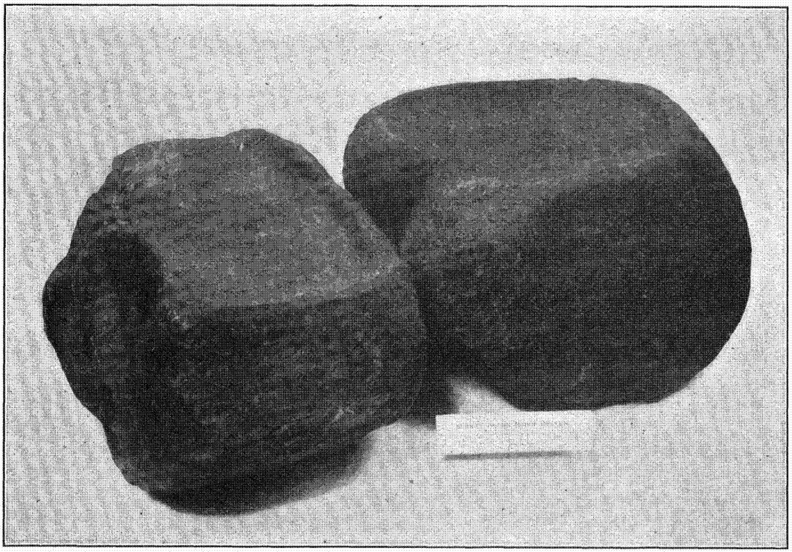
FIGURE 57.

7939. 3.8 in.	943. 3.1 in.	944. 3.4 in.	943. 3.6 in.	7580. 3.8 in.	940. 3.4 in.	941. 3.2 in.

Depth, 1.7–2.5 in.

In many of the *heiau* or *luakini* were found lavers of considerable size cut from stone but not elaborately worked. If a tolerably flat stone with a slightly concave surface could be found this concavity was deepened by patient pounding and grinding until a great, though shallow, bowl resulted of capacity sufficient for the washing of a human body: and here were washed the victims for the sacrifices. On the abandonment of the ancient system of worship in 1819 many or most of these were broken up, but a specimen remains near the heiau called Mokini in Kohala, Hawaii, large enough to contain an outstretched human body with perhaps three or four inches of water. These were certainly the largest stone dishes made by the old Hawaiians.

My attention has been called to certain stones (of which I have seen perhaps six) of roughly cubical form cut on one face into a shallow depression with a narrow rim (Fig. 58). I have been told that they were used for evaporating sea-water in the time of Umi. Although I have only seen the ordinary mud-pans used for salt-making, there is nothing improbable in that statement.* On Hawaii Messrs. Tyerman and Bennet† noticed this use of stone containers in 1821.



3212 FIG. 58. STONE SALT PANS. 3213

"April 5. We had an opportunity of seeing how the natives collect salt, of which they furnish large quantities to ships, besides what they consume themselves. Small ring fences of masonry work are formed near to the sea, within which are placed rude stones, of all shapes having deep cavities, which may hold from one to two or three gallons of water. These being filled and evaporated from time to time, the salt is deposited, and ready for use without further trouble. In one of these basins we observed about half a gallon of fine salt.

Lamps.—The old Hawaiians had artificial lights of several sorts. There were the *lama* or torches of bambu stuffed with candlenuts or other combustible matter and the *lamaku* made by stringing the meats of roasted candlenuts on the midribs of coconut leaflets and binding together half a dozen or more of these strings with dried banana leaves. Such a torch, perhaps six inches in diameter and four feet long, gave a bright but smoky and odoriferous blaze.* In almost universal use were strings of these nuts four, six or ten meats for the slight household illumination required before reading was introduced. The kukui was tended by a child who ignited the next as the preceding nut was nearly spent by inverting the candle and when the kindling was complete knocking off the burned coal. While burning they were often rested against a stone. They gave a very intermittent and smelly light but were in use in the outlying districts as late as 1865, but since then the advent of kerosene oil has finally extinguished them.

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* Since the above was written the two specimens figured have been added to the Museum collection.

† Journal of Voyages and Travels. Boston, 1822, Vol. II., p. 19.

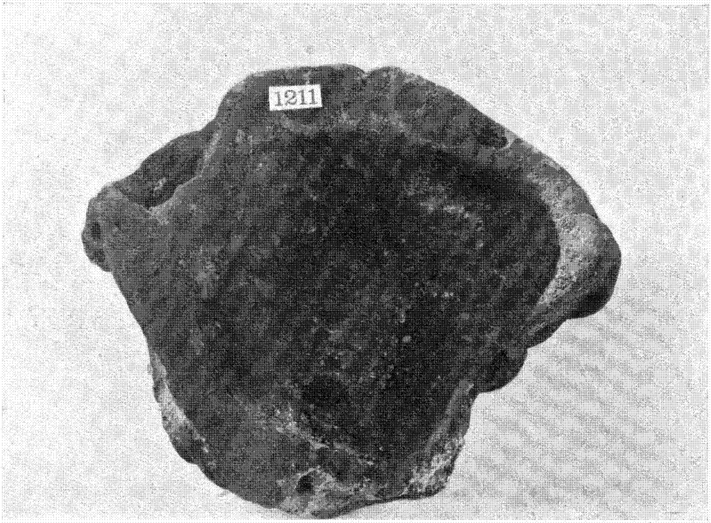

FIG. 59. LAMP FROM A LAVA BUBBLE.

The illumination we are most interested in here comes from the oil lamp which was usually made of stone, although I have seen coconut shells and even a green papaya fruit (*Carica papaya*) used to contain the oil. In the Bishop Museum is a *wooden* lamp, No. 1212. The oil was expressed from the kukui or kamani nuts in the stone mortars, and animal fat was often substituted. The wick was a strip of kapa torn from a man's *malo* or a woman's *pa'u* as there was need. One advantage of these simple bowl lamps was that an increase of light was readily obtained by adding wicks, an addition as easy as it is difficult to put a wick to a modern civilized lamp, and as many could be added as the rim of the bowl would permit.

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*I well remember the first time I saw these torches used. The American Minister Resident, Dr. James McBride, and I were travelling along the north coast of Hawaii in 1864. We had loitered behind the rest of our party and darkness came upon us as we came to the brink of the valley of Laupahoehoe. The road then led down into the valley many hundred feet below us by a narrow, steep and dangerous path, in some places overhanging the ocean, and we were glad to see the torch bearers in the valley coming to light our path, although trusting to the sure footed animals we were far down the path before the torches came, and I could smell them a long way off.

Perhaps the Hawaiian maker of lamps gave freer rein to his fancy than did workers in other stone objects, but it will be seen by Plates XLVIII.–LII. that there was some variety if little beauty in this comparatively unimportant household utensil. The simplest that I know is No. 1211, shown in Fig. 59. A bubble in the lava has been selected and the superfluous stone knocked away. It is a charmingly aesthetic treatment, wholly free from the stiffness generally seen in these lamps. We neither know who made it nor who used it. In this as in most of the Hawaiian remains there is a complete impersonality: in the few attributed to famous warriors or high chiefs there is nothing peculiar, the specimen is like dozens of other specimens and so far as that goes might have been made for Kaahumanu or Liloa, for Pele or Lono so far as the stone shows any individualism. Another peculiarity of the Hawaiian mind helps to cut off the entail as it were. Hawaiians seem ashamed of all that their ancestors made or used in the ages before the advent of white civilization and have removed so far as possible all relics of that indigenous civilization. Most of the stone articles that could not be burned or conveniently thrown into the sea were buried or hidden in caves, and only lately when there is some market value attached to these works of their predecessors are they brought to light as a source of income. Under such circumstances it would be difficult to establish any genuine genealogy.

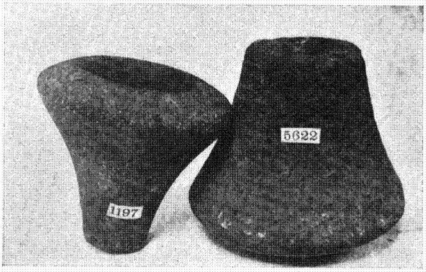
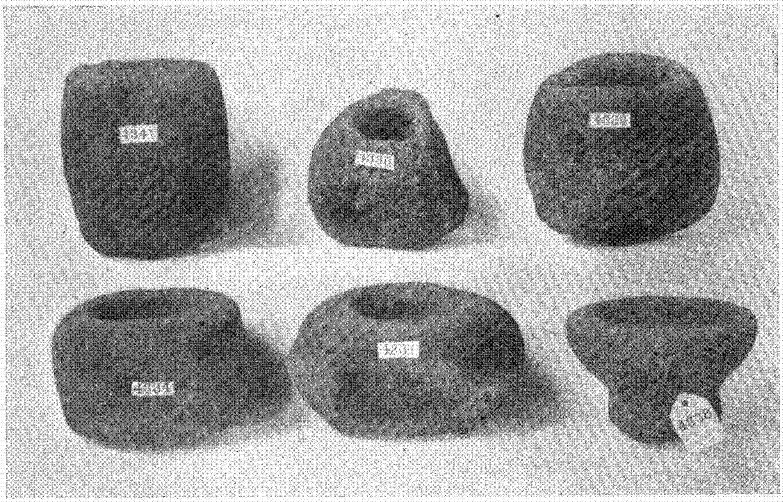


FIG. 60. LAMPS FROM BROKEN POUNDERS.

There is in some lamps an "improvement" showing some ingenuity. It appears in the small cup lamp, No. 7728, on Pl. XLVII. A little cavity sunk in the bottom of the bowl into which the last drops of oil might gravitate to feed the thirsty wick. This is almost always about a quarter of an inch deep and wide, and appears in about one-quarter of the lamps in the Museum collection.

Another example of the utilization of natural opportunities is shown in No. 1203, Pl. XLVIII., where two holes were taken and the surrounding cellular lava rudely shaped into a lamp. A third slight depression is by the side of these two holes and might easily have been deepened; a shell attached to this indicates the seaside origin of the holes for which a stone-boring echinoderm is perhaps responsible.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4331
4338

FIG. 61. RUDE FORMS OF HAWAIIAN LAMPS.

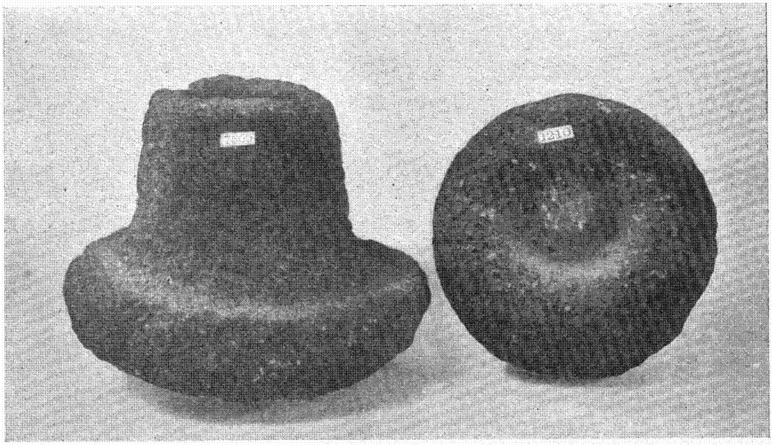

FIG. 62. STONE LAMPS FROM MOLOKAI.

Accidents often furnish a partly formed lamp as shown in Fig. 60, where two broken poi pounders have been regenerated (No. 1170) by sinking a cup into the broad end; No. 5622 by using the smaller end in the same way. In the latter the base is slightly flattened, but in the former even the original oblique break has been left. This makes a very convenient form to carry in the hand although it will not stand without support. Lamps of this class were very common, as a broken poi pounder was a part of the furniture of most families. Some very rude forms are shown in Fig. 61, and as might be supposed such are not uncommon. No. 4336 is a shapeless fragment of stone converted easily into a lamp by boring or chipping a cup; No. 4331 is a similar rough fragment, while No. 4338 although of very rough workmanship still shows design. In Fig. 62 are shown two lamps, both from Molokai, and apparently from the same quarry. The material is crystalline, of a coarse texture, and by no means common. These lamps show that particular forms were not local, for in No. 7509 there is the broad base and high cup so arranged that kukui candles could be placed against the side (compare No. 1200, Pl. L.), while No. 1210 is the simple oblate spheroid. Both are large and heavy, evidently not intended to be often moved.

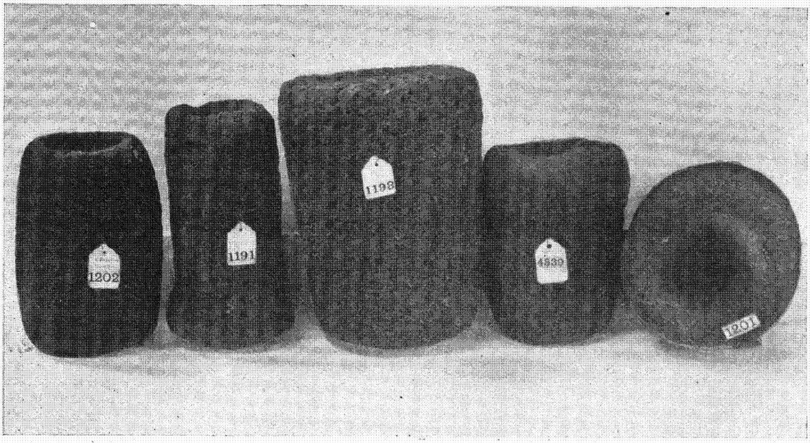

FIG. 63. CYLINDRICAL HAWAIIAN LAMPS.

In several of the Museum specimens there is a peculiarity that I have not been able to explain,—the lamp is invertible; that is, there is a poho or cup for oil at either end. Of this form are Nos. 1208 and 1190 of Pl. L., and in both the cup is of the same size and condition so that either could be used indifferently; certainly both have been used, as the oil burned into the stone testifies. In Pls. LI. and LII. are shown lamps of phallic form not uncommon among the Hawaiians. They are generally well wrought and would seem to belong to a comparatively late period. They are large and heavy, not easily transported. A common form of Hawaiian stone lamp is cylindrical, of varying height and diameter but remarkably uniform in appearance. The cup is also of nearly the same capacity in all. In height they vary from six to nine inches. No. 1202 was found at Haiku, Maui, but the provenance of the others is unknown. All are made of the same porous lava, seemingly unsuited to hold any liquid, but in use the oil soon burns to an impervious crust. The last in the group of Fig. 63 is what was called a *pohowaa* or canoe lamp used in the infrequent night voyages and also for fishing. This last use seems to be better illustrated in Fig. 64, which represents an unusual form in that it is of rectangular section with slightly rounded corners, and the bowl is much larger than usual in house lamps. The lower half tapers from a shoulder. The bowl was filled with fat, and with a wick of twisted rush or kapa, bright but flaring light was obtained. The lamp could be placed in the hole in the thwart intended for the mast, or in a similar hole in a board projecting over the gunwale. Night fishing was a favorite sport among the Hawaiians, although the lama or torch was generally used instead of a fixed lamp. I do not know much about the stone lamps of the other Polynesians except the Tahitians, and from that group I have seen only the finely designed and wrought lamps in the British Museum, and in that at Cambridge, England, the latter brought home by Tyerman and Bennet, if my memory serves. These are called "Sorcery Lamps", and may be correctly designated, but no more definite information has come to me of the way in which they were used. The name suggests a use like that of the Hawaiian kapuahi kuni anaana of Fig. 57. No part of the Pacific has retained less of the olden time than the Society islands. The conversion from ancient

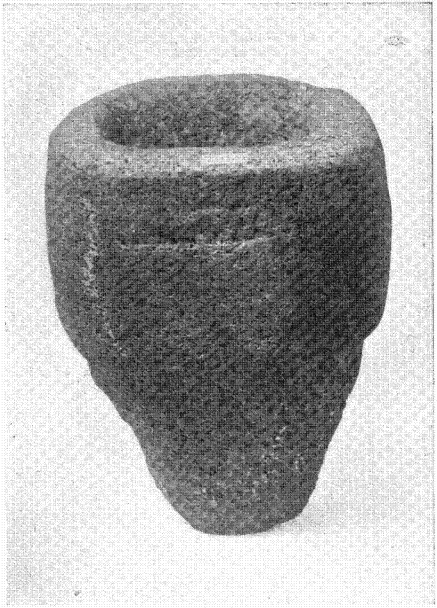

FIG. 64. FISHING LAMP.

idolatry was so sudden and complete that everything appertaining to the abandoned cult was destroyed or hidden. The new converts brought forth their treasures as did the hypnotised Florentines at the bidding of Savonarola and consigned them to the flames if thereby they might ransom themselves from Purgatory. Far more of ancient Tahitian implements are in foreign museums than on the group. The British Museum was especially favored since it has the articles brought home by that early missionary and careful observer Reverend William Ellis. Fig. 65 shows one of the several sorcery lamps in the British Museum and it will at once be noticed that the design and workmanship far surpasses anything we have on the Hawaiian group. The perforated basement seems peculiar to this form of lamp. The cup for oil is exceedingly large, suggesting that it was used like the *kapuahi kuni ana*, to burn other material than merely light-producing oil. The arch over the bowl could not conveniently be used as a handle, for the smoke of combustion made it constantly sooty, and its size was also in the way. Perhaps it was a rest for kukui nut candles. Something seems to have been broken from the top of the arch, possibly a consecrated figure. That the general size of the Hawaiian stone lamps may be understood, I give here the height and diameter with any explanation seemingly required:

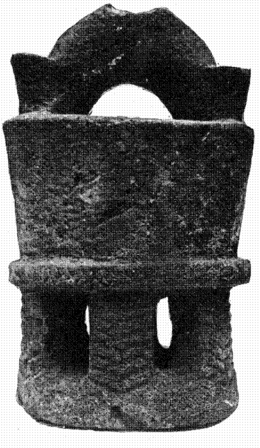

FIG. 65. TAHITIAN SORCERY LAMP.

FIGURE 59.

1211. A bubble of surface lava, 3.5 in., 6.5 in.

FIGURE 60.

1197. End of a broken poi pounder; the larger end hollowed out; 4.5 in.

5622. Broken poi pounder; hollowed at the smaller end; 4.7 in., 5.2 in.

FIGURE 61.

4341. 4.7 in., 4.4 in.

4336. A seaworn block; two natural cups, the deeper (2.5 in.) used; 4 in.

4332. Incrusted with burned oil; 4.6 in.

4334. Neatly rounded; 3 in., 4.5 in.

4331. Has a deep cup; 3.2 in.

4338. Olivine lava; 3 in., 4.4 in.

FIGURE 62.

7509. Large and heavy; lava full of felspathic crystals; Molokai; 8.2 in., 10.5 in.

1210. Of the same stone and from the same locality as last; 5.7 in., 9 in.

FIGURE 63.

1202. Haiku, Maui; 6.7 in., 4.4 in.

1191. Deep cup with cistern; 7.5 in., 3.5 in. (top).

1193. Cylindrical, of coarse lava; 8 in., 6 in.

4339. Cistern in cup; 6 in., 4.5 in.

1201. Cup 2.5 in. deep; Pohowaa; 6.2 in., 5.2 in.

FIGURE 64.

7959. Boat lamp for fishing; cup 3.7 in. deep; 8.7 in., 6.5 in.

PLATE XLVIII.

7759. Deep cup with cistern; 6 in.

1203. Three natural cups, two of them used; 5.5 in., 8 in.

7758. Flat base, very large cup; 4.2 in., 5.9 in.

1206. Spherical, broken on the lip; 6.5 in., 6 in.

4330. Cistern in cup; 3.7 in., 5.2 in.

PLATE XLIX.

1205. Square block with rounded corners; 4.5 in.

1194. Upper portion pentagonal; 5.2 in.

7691. Cistern in cup; 3.5 in., 5.5 in. [Wrong number on plate.]

1226. Perhaps also used as a mortar; 4.7 in., 7.2 in.

1207. Unwrought, small cup; 5.7 in.

1228. Cistern in rather shallow cup; 2.2 in., 6.7 in.

PLATE L.

1208. Cup at each end, the upper one larger; 5.7 in.

1232. Found in 1880 at Kulaokahua, Oahu; deep cup; 6.5 in., 8.2 in.

1209. Large cup without cistern; 6 in., 6.7 in.

1200. Cistern in cup; Kohala, Hawaii; 5 in., 3.7 in. (top) 6.6 in.

4333. Round as if turned; striated stone; 5.5 in., 6.5 in.

1190. Cups at both ends with cisterns; 5.5 in.

PLATE LI.

1182. Coarse lava, phallic; 10 in., 7.7–3.7–4.6 in.

7690. Very well formed, cup 2 in. deep; 8.1 in., 4.8 in. (head).

1183. Cup large, grooved for candles; Niihau; sandstone; phallic; 11.5 in.

1189. Base rectangular (3.7 × 3.2 in.); 7 in., 4.8 in. (head).

1184. Phallic; 7.2 in., 7.7 in. (base).

PLATE LII.

1185. Nuuanu, Oahu; greenish lava, shallow cup for nuts; 8 in.

4340. With a curious rim; 7.5 in., 6.2 in. (rim).

4337. Broad top, narrow base; 4 in.

1192. Cistern in cup; 5.2 in.

1187. Cup 2 in. deep; 4.2 in., 3.7 in.

1186. Small cup and four feet; Waimea, Hawaii; 6.2 in., 4.2 in. (head).

1188. Smooth finish, phallic; 6 in., 4.7 in. (head).

Stone Mirrors.—The *Kilo pohaku* of the Hawaiians were most ingenious. Some native Narcissus admiring his face in some placid pool may have caught the suggestion and, wiser than the beloved of Echo, instead of pining away for love of the intangible image, devised a means of recalling this image at pleasure. Whoever may have been the lucky inventor, the results as we have them today are certain well-ground circular disks, less than half an inch thick, and of diameter varying as shown in Fig. 66. These were not highly polished and do not in the least reflect when in a dry condition, so their properties would be concealed from a casual observer, but placed in a shallow calabash of water the dark background of the stone gives back a sufficiently clear reflection. I have never seen any of these mirrors of other than circular form. They rapidly disappeared from use with the advent of European glass mirrors* and their use was soon forgotten. In the native kahuna lapaau practice they are occasionally used as a cooling application to furunculi or other ulcerous sores, and for this use holes are often bored near the edge through which a cord for suspension could be passed.

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*There is in the Bishop Museum a strip of "silvered" glass given by Vancouver to Kamehameha, to which has been fitted a neat frame of native wood: similar mirrors, but of smaller size, were attached to handkerchiefs by the Hawaiian women, much like the fashion of attaching small mirrors to folding fans, once in vogue among white ladies.

I know of no other sub-civilized people who have adopted this ingenious conception. Specimens are no longer common. The stone is a sort of basanite, quite as compact as the phonolite used for adzes, and it is of a uniformly dark color in all the examples noted. It is supposed to come from the uplands of Maunakea on Hawaii.

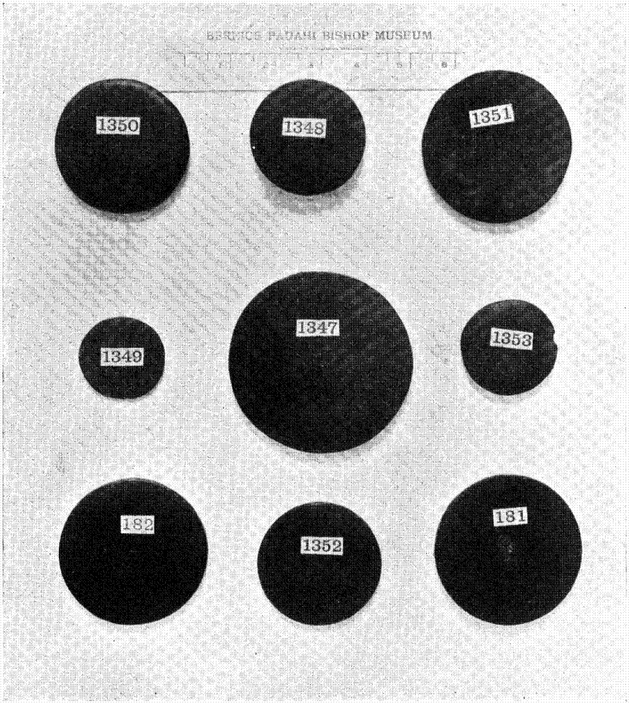
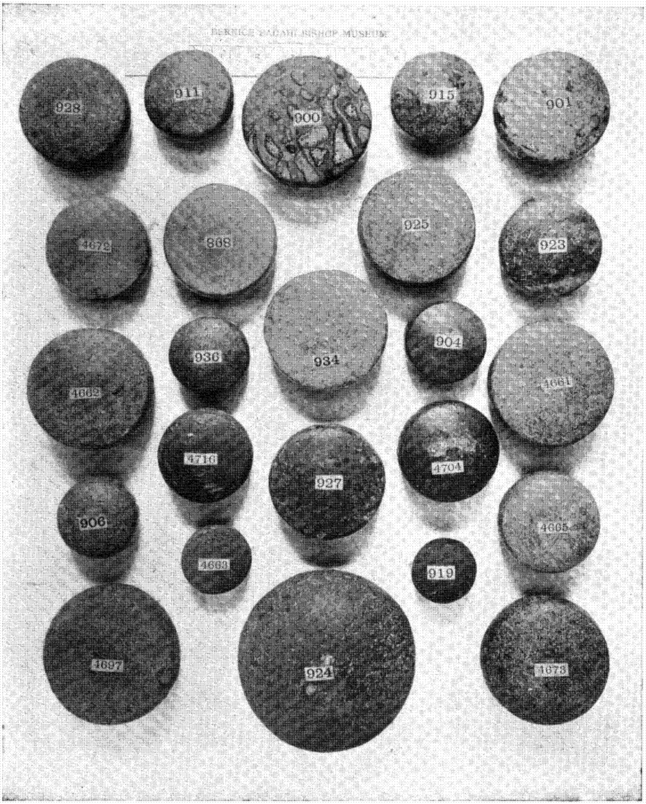


FIG. 66. HAWAIIAN STONE MIRRORS.

Ulumaika.—Made much in the same way but for a very different purpose are the Ulumaika stones. The game *maika* was played with stone disks (or sometimes balls), called on Hawaii and Kauai *ulu*, while on the intervening islands of the group, Maui and Oahu, *olohu* was a more common designation. A full description of the game, which was a favorite one from Hawaii to Niihau, will come properly into the chapter on Amusements, but here it may be briefly stated that a smooth alley or *kahua* fifty or sixty yards long was built as for bowls, and on this was played three forms of the game. The first was a competitive trial of strength in settling how far the stone could be thrown, or rather bowled, and the old *mele* often tell of fabulous distances covered by the ancient Hawaiian heroes. The second required more skill than strength to drive the ulumaika between two upright sticks a few inches apart near the end of the kahua, or thirty to forty yards from the bowler.* The third was rather a trial of the ulu than of the players, as the stones were rolled against each other and the toughest won the game for its owner. There is a famous kahua near Kalae on Molokai, where I have seen hundreds of ulu so broken that the fragments were not worth carrying off. The players trained carefully and became very strong and skilful. Practice began in


BERNICE PAUAHI BISHOP MUSEUM
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4661
4716
927
4704
906
4665
4663
919
4697
924
4673

FIG. 67. HAWAIIAN MAIKA STONES.

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* Narrative of a Tour through Hawaii by William Ellis, p. 187. Second edition. London, 1827.

early youth, and children used rough and unpolished stones for their play. Various kinds of stone were used as we have seen was the case with the squid-hook sinkers, but a heavy compact coral rock seems to have been the favorite; it was sometimes artificially colored, and indeed it was generally stained by the coconut, kukui or kamani oil with which the choicest ulu were frequently anointed. Wood was sometimes used instead of stone, as in No. 902 in the Bishop Museum which weighs 11.2 oz. and belonged to the Princess Keelikolani.

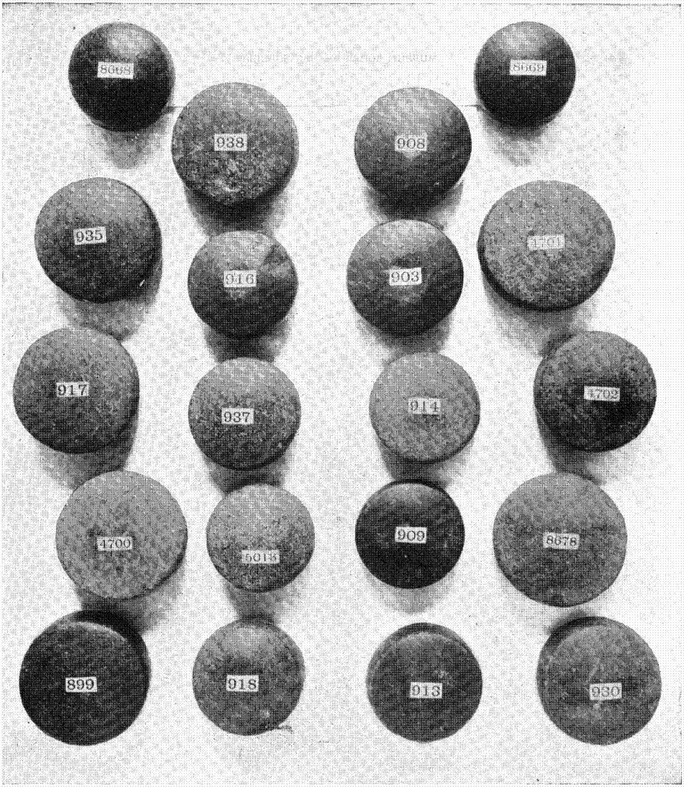

FIG. 68. HAWAIIAN MAIKA STONES.

While sometimes spherical, as has been noted in the description of stone balls, ulu were mostly thin cylinders with slightly convex sides; the edges were often rounded, Of those in the Bishop Museum the largest is five inches in diameter and three inches thick; it weighs forty-four ounces; the smallest is one and seven-eighths inches in diameter and weighs three and one-half ounces. That the thickness of the disk bears no definite relation to the diameter may be seen in Fig. 69. Some of the best ulu are shown in Figs. 67 and 68, and the following table will give the size and weight:—

	Number.	Diameter.	Thickness.	Weight.	Material.
FIGURE 67.—	928.	3.1 in.	1.6 in.	14.7 oz.	Coral rock.
	911.	2.6	1.6	9.5	Coral rock.
	900.	3.7	2	22.5	Brown and yellow breccia, Hawaii.
	915.	2.7	1.8	11.7	Coral rock.
	901.	3.2	2.2	18.5	Coral rock, highly polished.
	4672.	3	1.5	11.5	Coral rock.
	898.	3.3	1.6	15	Coral rock, sharp edges.
	925.	3.4	1.8	18	Coral rock, sharp edges.
	923.	3	1.8	12.2	Breccia, chipped.
	936.	2.3	1.5	7	Coral, stained.
	934.	3.5	1.5	20	Coral; Kailua, Hawaii.
	904.	2.4	1.5	7	Yellow breccia, chipped.
	4662.	3.6	2.1	23	Compact coral rock.
	4716.	2.8	1.8	11.5	Basalt.
	927.	3.4	1.7	11.2	Yellow breccia, chipped.
	4704.	3	1.8	11.5	Lava, much defaced.
	4661.	3.6	1.9	22	Coral rock, beautifully polished.
	906.	2.4	1.7	8	Coral rock, very convex.
	4663.	2.1	1.4	3.5	Grey lava, one face chipped off.
	919.	1.9	1.3	4	Rough lava; used by children.
	4665.	3	1.8	14	Coral, well polished; Liliuokalani.
	4697.	3.9	2.2	31	Coral, chipped.
	924.	5	3.1	52	Lava, with cells filled; very convex.
	4673.	3.7	1.9	24	Coral rock.
FIGURE 68.—	8668.	2.7	1.7	8	Red stone with brown veins.
	938.	3.3	1.8	19	Lava.
	908.	3	1.8	14	Lava, stained red; North Kona, Hawaii.
	8669.	2.7	1.6	9	Light brown compact stone.
	935.	3.2	1.8	16.2	Lava, stained red; well polished.
	916.	2.9	1.6	13.2	Lava, stained red.
	903.	3.1	1.6	16	Red lava (?); Hilo, Hawaii.
	4701.	3.4	2	23	Sandstone (?).
	917.	3.2	1.8	14.7	Grey lava, unsymmetrical.
	937.	2.9	1.7	11.7	Lava.
	914.	2.8	1.5	12	Grey lava, not polished.
	4702.	3.1	1.9	12.2	Black lava.
	4700.	3.4	2	16.5	Material resembling blue clay.
	5013.	3	2	12	Coral rock; belonged to Mopua.
	909.	2.9	1.4	11.7	Black lava.
	8678.	3.4	1.8	16	Lava; F. A. Hosmer.
	899.	3.4	1.7	14.5	Grey lava.
	918.	3	1.8	13	Compact lava.
	913.	3.1	1.7	11.2	Grey lava.
	930.	3.2	1.8	18.2	Compact lava.
	Average:	3.09	1.77	17.15	

These forty-four ulu have been selected from the large number in the Bishop Museum (see Fig. 69 for others) solely on account of their fine finish, and they will probably fairly represent the forms used by the best players. I am puzzled by the unsymmetrical specimen No. 917, for it is difficult, if not impossible to roll it straight. Did the ancient Hawaiians have "trick bowls"?

Not only has this fine game faded from the memory of the fading Hawaiians, but the stones have become curiosities to them. I once asked an intelligent Hawaiian the name of these stones, and his reply was, "*Aole ike wau; pohakn kapili waa paha.*" "I do not know; perhaps a stone to pound a canoe." Indeed they have often been used as hammers, and many have dents on the edge or sides. Another use for the rough, poorly finished ulumaika I have noticed several times. In the sand burials at Koloa, Kauai, and near Leahi on Oahu, they were placed under the chin of the corpse, which was arranged in a sitting posture with the knees against the breast. Curiously enough two of the three instances noted were female skeletons; the other was not recorded; but as women did not play maika these were not cases of prized possessions buried with the dead,—rather a pillow for the tongue in the long sleep.

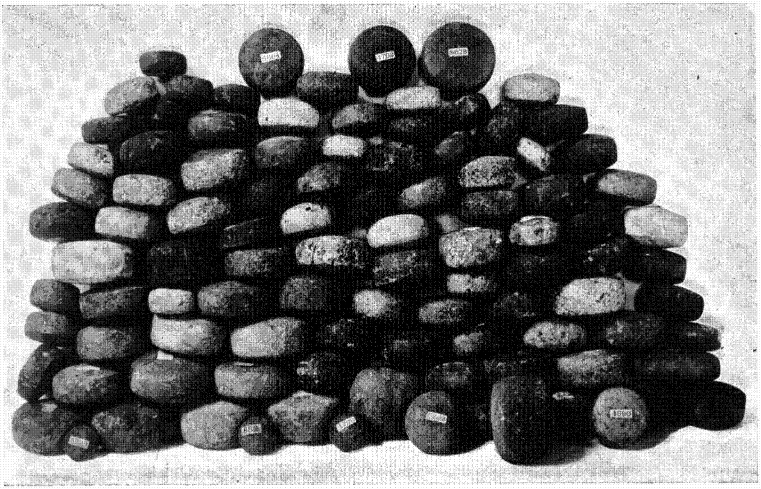

FIG. 69. PILE OF MAIKA STONES.

Exactly how the ulumaika were made I cannot say, for the methods told to me (the process ceased long before I came to the Islands) vary considerably, and I could not regard my informants as very *akamai* or skilful in the matter. From the large collection at my disposal I have arranged the stages somewhat as follows, although the order in any individual case might of course be varied: stone roughly rounded; sides ground flat; accurately rounded; sides made convex by grinding between grooved stones which were held so that the grooves were at an acute angle with each other; polishing the stone. Specimens of all these stages are in hand; some are given in the figures, for the last two are sometimes omitted and we have simply a flat circular disk without polish.

Ring Cutting.—The native Hawaiian bambu is of small diameter and so could not be used as the larger species are, so ingeniously, by the islanders of the western Pacific to cut disks and rings from stone or shell, but the process has produced so many specimens in all large ethnological collections that it may fairly be described here. If the Hawaiians could have had it the making of ulumaika would have been greatly simplified. I have selected for illustration a large heavy ring of limestone used as a *cindalo* or god on one of the Solomon group, and it will be seen in Fig. 70 that the central hole is cleanly bored. No. 1883 is 9.6 inches in diameter and it was probably rounded in the Hawaiian way between stones, but the hole which measures, as seen by the scale, only 3.2 inches was bored with the bambu drill. The two lower rings in the same figure are of a much harder material, the shell of the huge bivalve *Tridacna gigas*, common through Micronesia and the Bismarck archipelago. I have seen good steel drills broken in the attempt to pierce this shell, and yet it will be seen that the bambu has done its work with success and neatness. The rings, which come from northeastern New Guinea, are used as bangles or wristlets and are made by patiently twisting a loaded bambu of suitable diameter and armed with silicious sand and water. A fragment of the shell is bound around with slips of rattan, as shown in Fig. 71, and fitted snugly into a cavity of a block of light suberose wood, probably a species of *Erythrina*. With the feet resting on this block the workman twists right and left the ever shortening bambu, which is four or five feet long at the start and usually has a stone of one or two pounds weight attached to one side. Water and sand joined to the siliea of the bambu will in time work through the hard shell. In a specimen of the bambu in the Bishop Museum the cutting edge is roughly serrated and thin. When the central hole was bored a larger bambu was used to complete the ring.

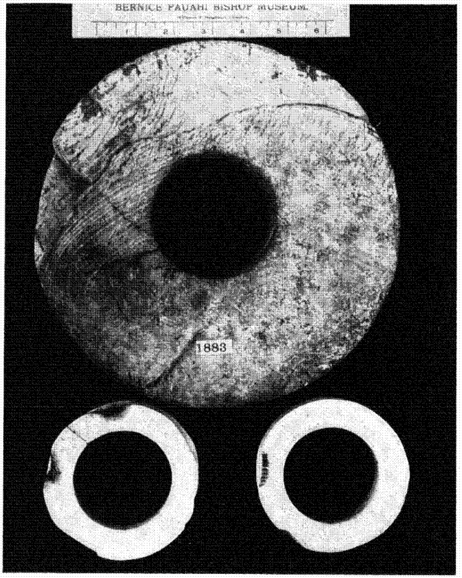

FIG. 70. RINGS OF LIMESTONE AND SHELL.

For boring small holes in stone, shell, or bone, the old Hawaiian used fragments of lava made fast to the spindle of the universally known "pump drill", and in most cases the hole was not bored directly through but countersunk, as it were, from both sides until the conical holes met in the middle of the object to be perforated. In this way were bored the holes in dog teeth for attaching them to the net for anklets to be worn in the hula. One pair of these hula anklets in the Bishop Museum has nineteen hundred holes, each drilled from both sides!

Fishing Stones.—A peculiar method of fishing in vogue among the old Hawaiians consisted in suspending in the water club-shaped pieces of wood smeared with some bait (*palu*) supposed to be attractive to the fish, and then hooking or scooping the assembled prey. Many of these *laau melomelo* are in the Bishop Museum, and many of the formulæ for bait used to render the log attractive have been published in an early catalogue of this Museum.* Stone was sometimes substituted for wood, although rarely, and the only two that I have seen are shown in Fig. 72 (Nos. 7453 and 7452). They are well made, doubtless for some person of importance, and have been carefully kept. The longer one measures 9.5 inches and is of very graceful outline. In shape they resemble magnified "amulets" or "plummets" so common on the American continent. Most of the fish caught by means of these *pohaku melomelo* were small shore fish and the process will be described more fully in the chapter on Fisheries.†

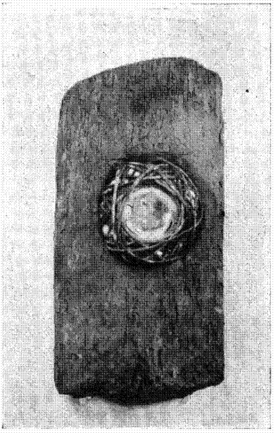

FIG. 71. METHOD OF BORING SHELL RINGS.

Papamu for Konane.—The game of *konane*, a favorite one among the upper classes of old Hawaii, was usually played on a wooden board (*papamu*) marked with spots arranged either in files or quincuncially and of indefinite number. In some cases stone took the place of wood, as in a fine specimen in the Bishop Museum (No. 5313). Here a large flat stone 16×24 inches is dotted with depressions (about 120) in files, but I have seen a much larger series of these pits upon the flat lava slabs *in situ* near Kailua, Hawaii. The "men" used in playing were beach-worn pebbles of black lava and white coral.

Axes and Adzes.—If this important class of stone implements has been left until now it was not for insufficient appreciation, nor poverty of material, except in the first mentioned tool, where No. 4603 (Fig. 73) is not only the single specimen of its kind in the Bishop Museum, but the only one I have seen. It is a great stone wedge 7.5 inches long and 2.5 inches on the blade. It is of hard and durable clinkstone weighing 2 lbs. 13 oz. The angle of the wedge is about 65°. When used as an axe it was doubtless bound to a handle, although the very blunt end would seem to render the attachment difficult. Except for riving logs I do not know what work such an axe could do that might not better be done with the more common adzes. Another more common form of axe is shown on Plate LVII., No. 3141.

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*A Preliminary Catalogue of the Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History, Pt. II., p. 95. Honolulu, 1892.

†The Indians of Vancouver used sinkstones of the size of a goose egg and shaped like those described in the text, to twirl the bait. Mem. Anthrop. Soc. London. III., p. 261.

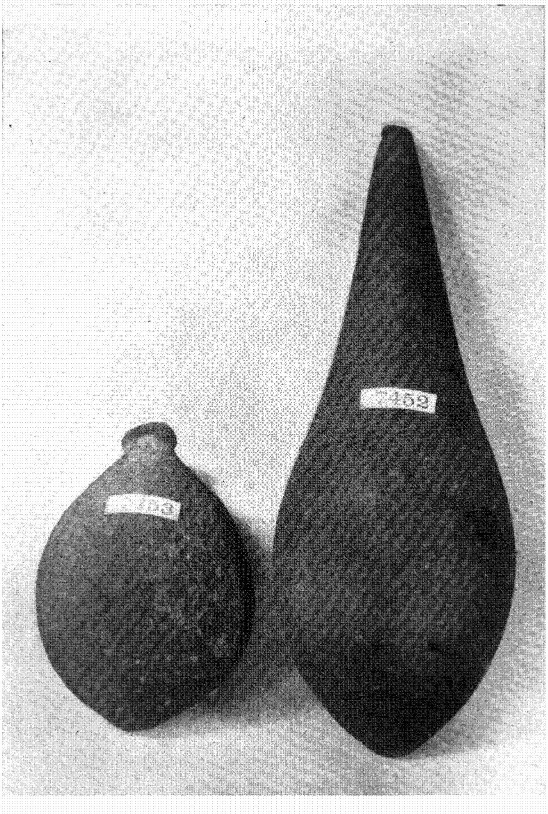

FIG. 72. HAWAIIAN FISHING STONES.

That the Hawaiian adze is peculiar and not very closely allied to those of New Zealand, as claimed by Moseley in the Voyage of the Challenger, nor indeed to any other of the Pacific forms will, I think be plain enough from the many illustrations herein given (Plates LIII. to LVII., and Figs. 74–79). As it has several times been asserted that Hawaiian and Maori adzes were more closely allied than those of any of the other Pacific groups, I have given illustrations of Moriori adzes (Figs. 81 and 82) from the Chatham islands as well as a series of the later Maori forms (Plate LIX.) probably derived from their predecessors. I have also shown the chisel-like greenstone adzes from the Solomon islands (Fig. 78) which differ most from the Hawaiian. The Hawaiian peculiarity consists in the parallel sides and angular tang, but it is not to one definite shape that all Hawaiian adzes conform. For instance, the plates show that parallelism of the sides is not constant and in the larger specimens there is a wide departure, but all the while there is a strong family resemblance among them all. To show the cutting edges of these tools more clearly than the photographs can I have made tracings (Fig. 74) of some of the more important examples illustrated in the plates and figures. The numbers will identify the specimens in both cases. The angle certainly seems too obtuse to cut well, at least on some examples, but the work done with them in the hands of an old Hawaiian remains to this day to silence all doubts of their capabilities.

Let us climb to the workshop of the adze maker. All these were in high places, and one on Mauna Kea, Hawaii, was nearly 12,900 ft. above the sea. As good clinkstone was not found in many places the known quarries hardly exceeded half-a-dozen. On Hawaii was the most important of all, that on Mauna Kea, where the workmen could only work in favorable seasons for the snow frequently covered the quarry, but from the immense quantity of fragments and chips the work must have extended over many generations; so far as known, this was the earliest quarry exploited, and it is puzzling how the place was discovered when we consider the aversion the Hawaiians had to even visiting those high, bleak and desert regions, the supposed abode of spirits not always friendly. It is possible that the tradition which speaks of the survivor of the deluge of Kahinalii grounding on Mauna Kea and following the receding waters to the lower levels, discovering the koi pohaku on the way, may point to the considerable antiquity of adze-making in this place, but I am inclined to believe that all traditions of the Hawaiian deluge date after the coming of the Spanish discoverers. It has

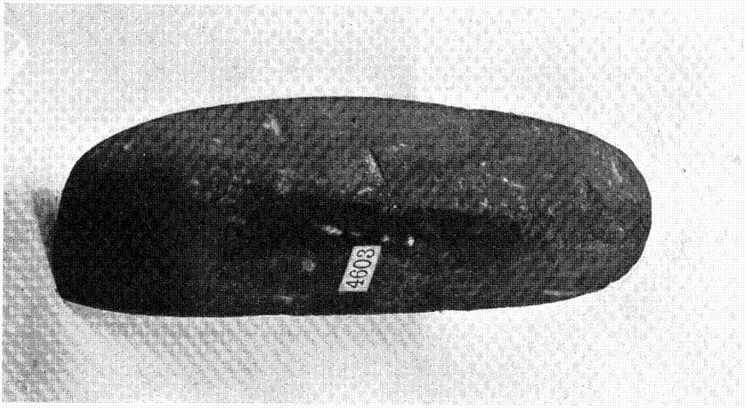

FIG. 73. HAWAIIAN STONE AXE.

always seemed strange that the axe-makers did not bring the raw material down to their homes and work it up in comfort instead of freezing in their kapa garments at this great altitude. It may be that the mystery of the place and its very solitude kept the trade in few hands and so enhanced the value of a tool that so many must have.

Another quarry on the same island was in an almost equally strange place, a lateral and deep crater of the volcano of Kilauea. The stone was obtained from the lower walls of the very deep pit and a subsequent flow of lava in the crater has covered all traces of the chips or working, but the name clings to the place (*Keanakakoi*, the workshop of the adzes), and there are masses of clinkstone, often of large size, scattered about the vicinage of Kilauea, apparently ejected by some explosive eruption like that of 1789. All the adzes from these two quarries are dark-colored and very compact. On Maui, far up the slopes of Haleakala, was a quarry which I have never seen, nor do I know the location. I know of no quarries on Oahu, although they may have existed, for clinkstone is found in fragments near Aliapaakai and elsewhere. On Kauai, above Waimea, the port where Cook first landed, are extensive quarries, and from these what knowledge of the working of adzes I may have was obtained. Various stone enclosures mostly in ruin and popularly considered *heiau* or temples are about the ridge where the clinkstone was worked, and while some were workshops or habitations necessary for shelter in that rainy region, there is every reason to believe that temples to the tutelary gods of the guild of adze-makers were there as well, for the ancient Hawaiians were a very devout people, acknowledging invisible superiors in all handicraft, and doing no serious work without invoking the aid and protection of these deities.

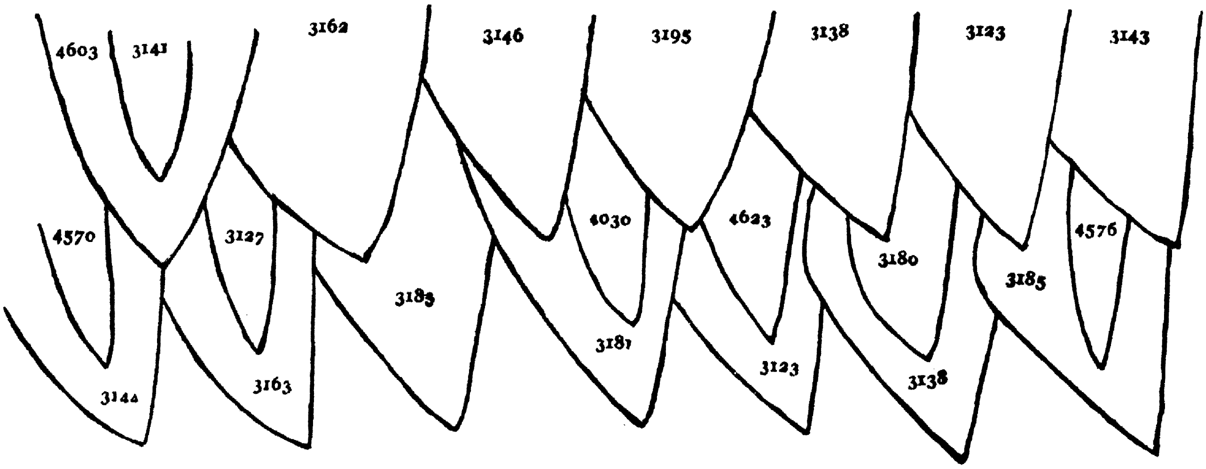

FIG. 74. CUTTING EDGES OF HAWAIIAN ADZES AND AXES.

Of course the making of stone adzes ceased soon after the introduction of iron and I have never seen them made, nor have I talked directly with any of the surviving makers, but I have seen them used and sharpened, and I have been astonished at the

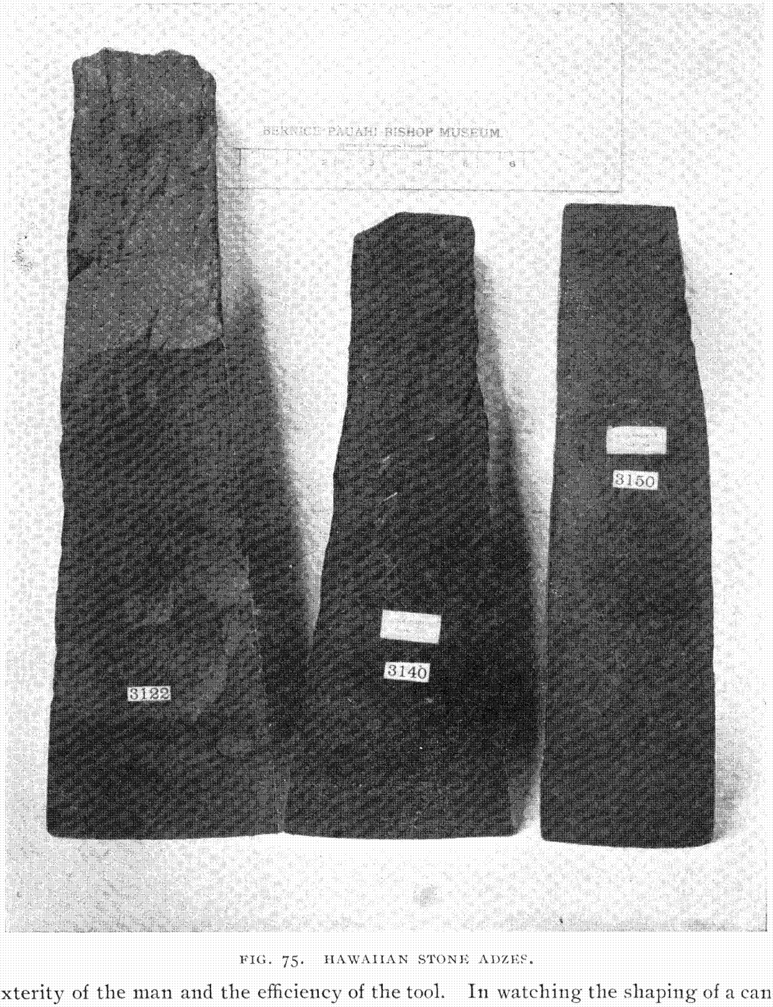
BERNICE PAUAHI BISHOP MUSEUM
1
2
3
4
5
6
3122
3140
3150

FIG. 75. HAWAIIAN STONE ADZES.

dexterity of the man and the efficiency of the tool. In watching the shaping of a canoe I have seen the old canoe-maker use for the rough shaping and excavating an ordinary foreign steel adze, but for the finishing touches he dropped the foreign tool and returned to the adze of his ancestors, and the blunt looking stone cut off a delicate shaving from

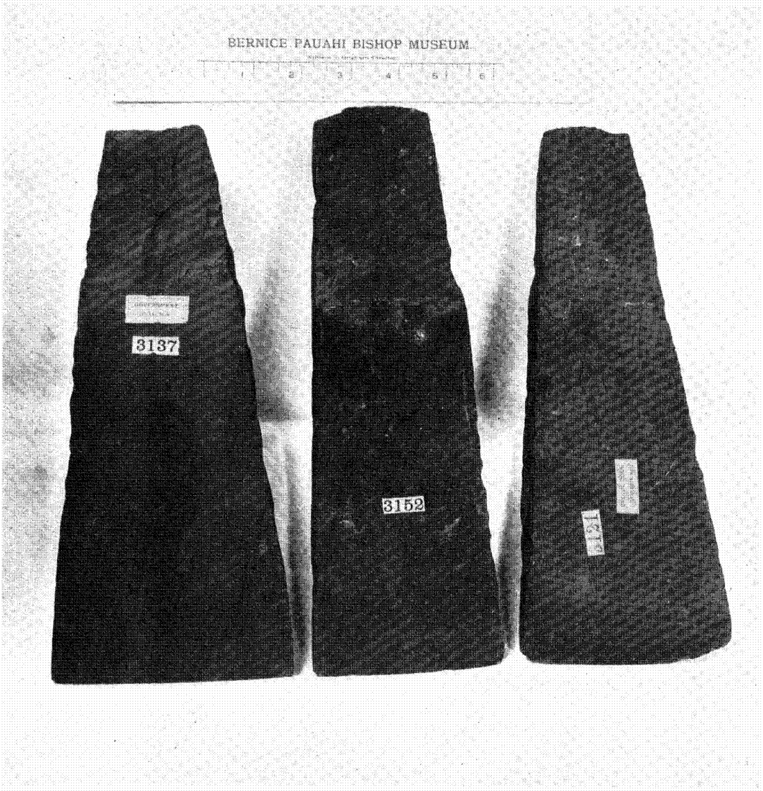

FIG. 76. HAWAIIAN STONE ADZES.

the very hard koa wood and never seemed to take too much wood as the foreign adze was apt to do. That skill was an important element in the use I was convinced, for with all the teaching of the native I could only make a dent where I tried to raise a shaving.

But to return to the ancient *Anakakoi*. The marks of fires, where the blocks of stone were heated to make sure there were no air cells to cause flaws in the *koi*, were common, and the cores, flakes (spalls) and shapeless fragments cover the ground, with here and there broken adzes, sometimes nearly finished before the unlucky break occurred. Plate LVIII. shows a series of "chips" from this workshop, obtained for me by Mr. Francis Gay, on whose estate the quarry is situated. These spalls and cores were obtained by the spalder with a rather heavy pebble hammer, but the nature of the stone is so different from the conchoidally fracturing flint that the shaping had mostly to be done by grinding, hence I was surprised to find few grindstones. Perhaps, as the workshop was abandoned long before the stone adze went out of use, the portable grindstones (See Fig. 9) were carried away to sharpen the old adzes, of which there was certainly a great supply. No stone implement is found so universally or abundantly all over the group. A study of this collection, small as it is, throws some light on the procedure of the old adze-makers. Apparently a number of spalls were chipped from the core when the fire test had proved the absence of air cells, and then a selection made for the various sizes and kinds of adzes desired, and it will be seen from Plate LVIII. that there was a great range in size, and even very small spalls might be utilized, as in No. 4602. The spall was chipped roughly into the desired shape, and if the stone was refractory and would not split as desired it was used for some other shape, or cast aside. Then the end intended for the blade was ground straight across as shown in No. 3, and to this normal the front and back were afterward ground. This first grinding served probably also to show the compactness or grain of the stone. No. 1 indicates that the sides were ground last, for in the fragment one side is ground smooth, the other partly. It will be seen on some of the many figures of adzes given that this finish was sometimes omitted on otherwise well finished adzes. No. 10 shows a partly formed adze with the sides ground and the blade broken away. No. 9 is a cellular highly silicious spall rejected as an impurity; in fact it seems a scum of the clinkstone. No. 15 is a fragment with large flat cells that have been exposed by the fire test.* No. 8 was fully formed for grinding and the edge was partly ground when the corner split off and the work stopped. No. 16 shows half of a spall of very heavy clinkstone suitable for a short adze or a scraper without tang. No. 19 seems to have been formed as far as possible by chipping and was ready for the grinding that never came. No. 4 shows a fragment of a rare form shown more fully in Fig. 77, which represents an adze (full size) of unknown use with the blade at an angle of 75°, with the axis of the adze like a turner's chisel. This is in the possession of Professor Curtis J. Lyons, of the Government Survey, who kindly lent the specimen for illustration. I think these adzes (of which I have seen only these two

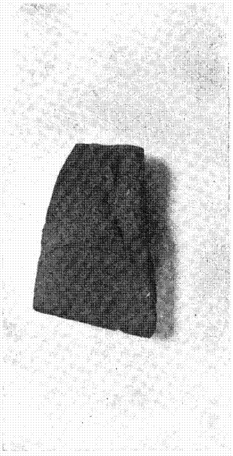

FIG. 77. HAWAIIAN ADZE WITH OBLIQUE BLADE.

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*It is generally the case that where cells occur in otherwise closegrained lava that the application of heat gives explosive force to the imprisoned air or other gas, and once while camping on Olokui, a mountain of Molokai, I built a fireplace of compact fragments of stone, and as the heat of the fire permeated the stones explosions so violent took place that we were obliged to move away for safety.

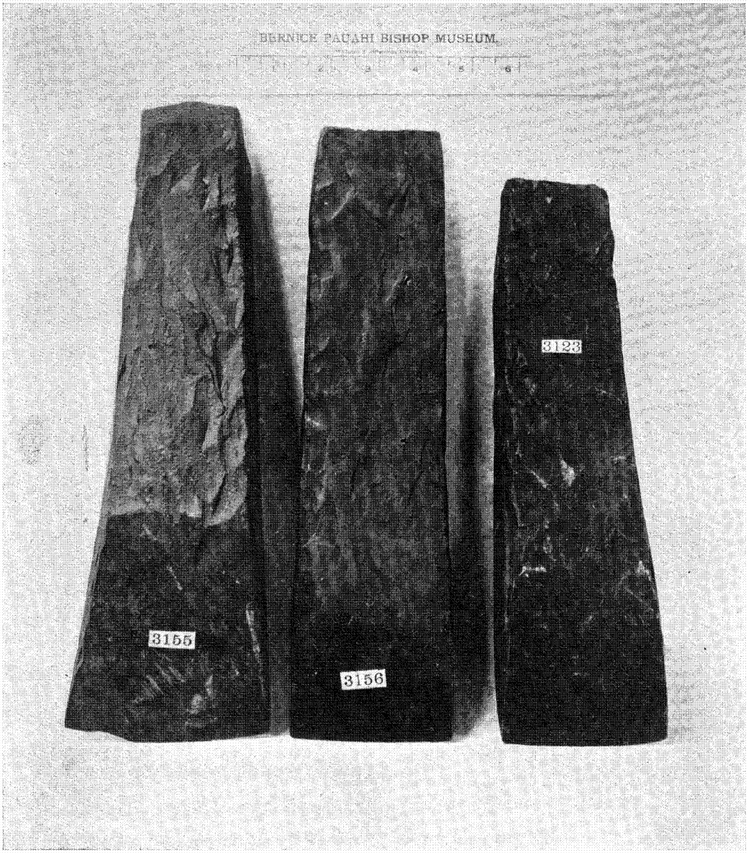

FIG. 78. HAWAIIAN STONE ADZES.

Hawaiian, but many Maori) were used in carving the large idols. Another unground but nearly shaped adze of large size is shown in No. 3153 of Plate LIV., found, I believe, at this same Kauai quarry.

Adzes may, for convenience, be classed in three divisions: with parallel sides and angular tang, *e.g.*, Fig. 79, No. 3447; Plate LVII., No. 3136; Pls. LV. and LVI.: with divergent sides and angular tang, *e.g.*, Fig. 78, No. 3155; Fig. 76, No. 3137: with divergent sides, thin and nearly flat, *e.g.*, Fig. 76, No. 3121; Fig. 78, No. 3123.

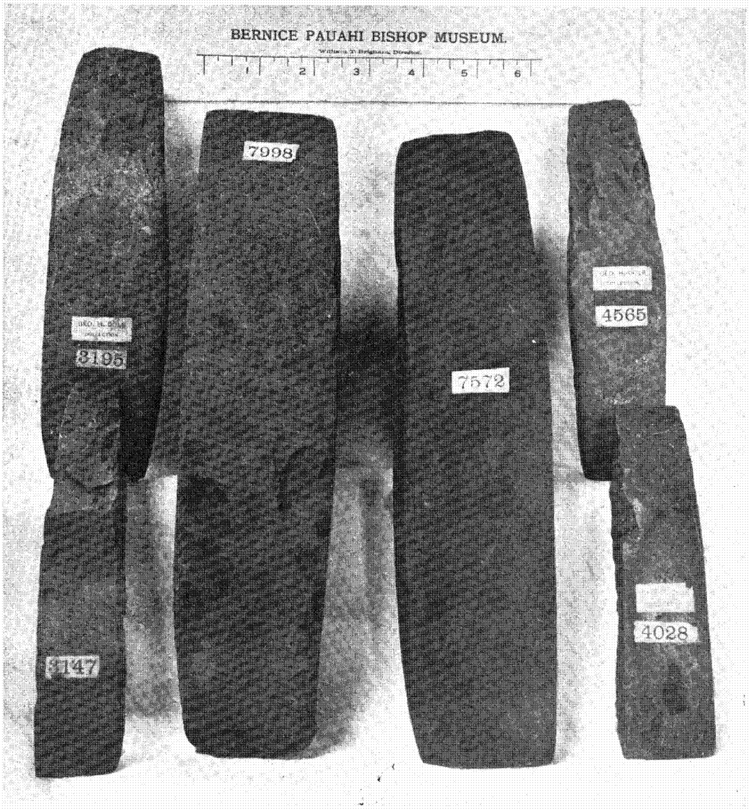

FIG. 79. HAWAIIAN STONE ADZES.

That each of these was fitted for particular work I do not doubt, but I cannot go any farther. The hardness of the wood influenced to a marked degree the angle of the cutter, and in very soft wood, such as wiliwili (*Erythrina monosperma*), coconut shell or alahee wood was substituted for stone as admitting a more acute angle for the edge. Plates LV. and LVI. and Fig. 72 show some variation. As the under surface is a curve it presents a constantly changing angle. The angles, as nearly as can be measured, vary from 34° to 78°; the weights from eleven pounds to less than an ounce, and the width of the cutting edge from an eighth of an inch to six inches, Placing the adzes figured in tabular form we have the following:—

	Number.	Length.	Width of blade.	Weight. Lbs.	Weight. Ozs.	Notes.
FIGURE 73.—	4603.	7.5 in.	2.5 in.	2	13	Axe, found on Kauai; 65°.
FIGURE 75.—	3122.	16	4.6	10	7	Well wrought, found on Kauai.
	3140.	12.8	4.5	7	1	Honuapo, Kau, Hawaii.
	3150.	13.2	3.3	5	5	Grey phonolite.
FIGURE 76.—	3137.	11	4.5	4	7	Broad and flat, dark phonolite.
	3152.	11	3.6	4	8	Edge of blade chipped.
	3121.	10.7	4.1	10	7	Finely finished, flat, black phonolite.
FIGURE 78.—	3155.	13	4	7	8	
	3156.	12.5	3.15	4	4	Dark phonolite.
	3123.	11.5	3.2	5	7	Well wrought; found on Kauai.
FIGURE 79.—	3195.	8.5	1.6	2	4	Blade broken; Kauai.
	7998.	11	2.2	5	..	Another view is given on Plate LVI.
	7572.	11.4	2.2	4	3	See also Plate LVI.
	4565.	7	1.3	1	4	Kauai.
	3147.	6.8	1.2	..	11	Liliuokalani collection.
	4028.	6	1.5	..	12	Kauai.
PLATE LIII.—	3125.	13.5	4.7	11	..	All on this plate are in the rough and entirely unground. No. 3139 is a darker clinkstone.
	3139.	13.2	3.3	4	10	
	8679.	11.8	4.2	5	13	
PLATE LIV.—	3153.	13.5	4	6	6	Blade much damaged; Queen Emma.
	6738.	13.4	3.7	5	..	Kona, Hawaii.
	8931.	13.5	3.7	4	4	Dark phonolite, thin.
PLATE LV.—	3122.	16	4.6	10	7	Found on Kauai; 36°.
	3150.	13.2	3.3	5	5	Angle to tang=32°.
	3155.	13	4	7	8	Waianae, Oahu; light colored phonolite.
PLATE LVI.—	6738.	13.4	3.7	5	..	Kona, Hawaii; front on Plate LIV.
	8931.	13.5	3.7	4	4	Front view on Plate LIV.
	3152.	11	3.6	4	8	Edge of blade chipped.
	7998.	11	2.2	5	..	Peculiar form of tang.
	7572.	11.4	2.2	4	3	Form similar to No. 7998.
	3167.	6.5	1.7	2	6	Polished on all sides; "*Na kini mahoe.*"
	3156.	12.5	3.15	4	4	Front shown in Fig. 76.
PLATE LVII.—	4576.	6.9	2.5	..	12.5	Grey phonolite, very thin; Kauai.
	4577.	5.7	2.1	..	8.5	Black phonolite, from Kauai.
	4562.	4	1.4	..	5	Well wrought, from Kauai.
	3135.	4.1	1.65	..	5	Kauai.
	4586.	3.7	1.7	..	7	
	4593.	4.1	1.4	..	6	Blade chipped, from Kauai.
	4585.	3.9	1.2	..	4	Blade chipped.
	4572.	4	1.5	..	6.5	Well ground, from Kauai.
	3180.	4.6	1.2	..	8	Dark phonolite; Palama, Oahu.
	3176.	4.9	1.6	..	7	Well wrought, dark stone.
	3141.	7.5	2	..	12	Axe of dark phonolite, thin.
	3129.	2	0.6	..	1	Kauai.
	4607.	2.7	1	..	2	Good polish.
	3131.	2.3	0.8	..	1.5	Finely wrought.
	4574.	3.2	1.6	..	3	Grey phonolite stained with red earth.
	4606.	3.3	1.2	..	3	
	4580.	3	1.2	..	3	Dark phonolite, from Kauai.
	4588.	3.5	1.7	..	6	
	4034.	3.2	1.3	..	3.9	Well shaped.
	4033.	3.4	1.6	..	4	Rough.
	4031.	2.5	1.2	..	1.5	Much like obsidian.
	4030.	3.1	0.6	..	2	Polished all over.
	4620.	4	0.7	..	4	Blade broken.
	5305.	4.1	1.1	..	4.7	Dark phonolite.
	4608.	3	0.8	..	1.5	Rough work.
	3132.	2.5	1.4	..	3	Broad and short, Kauai.
	4582.	2.9	1.2	..	2.5	
	4602.	1.5	0.12	..	0.4	Finely polished chisel; Kauai.
	3133.	2	0.9	..	1	Kauai.

	Number.	Length.	Width of blade.	Weight. Lbs.	Ozs.	Notes.
PLATE LVII.—	4583.	2	1	..	1	Brown phonolite, well wrought.
Continued.	4581.	1.8	0.8	..	1	
	4591.	2.2	1	..	2	Tang broken.
	4564.	2	1.1	..	2	Kealia, Kauai.
	4595.	2.6	0.8	..	2	Rudely wrought, obtuse angle.
	4038.	2.2	0.7	..	1	Polished only on top.
	4578.	2.5	1.1	..	1.5	Polished all over.
	4037.	2.4	0.8	..	1.7	
	4601.	1.4	0.6	..	0.7	
	4036.	2.3	0.6	..	1	Kauai.
	4039.	2	0.7	..	1	Grey phonolite, no polish.
	4600.	2.7	0.8	..	1.5	Kealia, Kauai.
	4599.	2	0.6	..	1	
	4598.	2.2	0.7	..	1	
	3136.	21.7	2.1	9	4	Found in a walled-up cave wrapped in kapa; evidently highly valued.

The last example in the list, which I have photographed with the small adzes to show the extremes, is peculiarly interesting not only from the circumstances mentioned, but for the remarkable length. It might have been used to cut the interior of coconut wood drums, or of deep canoes, or even umeke; but if so used why give it solitary entombment in a burial cave? There were no human remains nor anything else in the small cave, so the finder declared. Although the kapa is very durable in dry places it must have mouldered before all traces of a skeleton could have vanished. The adze is likely to remain a mystery. No. 4602, if used as a chisel, must have had some sort of handle, as the fragment is too minute to grasp firmly. It may have been intended for a borer to use with the pump drill, but it shows no signs of attrition on the vertical edges. As a mechanical proposition it seems difficult to get any efficiency from an ounce of stone used as an adze, unless indeed it had a weighty handle like the New Caledonian adze shown in Fig. 86 A and B. For felling trees the heavy and broad adzes, like No. 3121 or 3122, I have found by experiment quite suitable.

It is worth while noting that there is in the Bishop Museum an adze (No. 3115, not figured) which was in actual use so recently as 1886, and although the stone has been replaced by a plane-iron, the peculiar form remains in the old handle. The latest stone adzes I have seen in use date back to 1864, although I have no reason to suppose that they were abandoned for some years after that.

We may now examine a few other adzes from the Pacific Region, that their points of variation from the Hawaiian model may be noted. The Solomon islanders had a chisel-like axe or adze which not infrequently became more of a gouge than chisel. The material is always a dark green stone, neither so fine-grained nor so hard as the New Zealand greenstone. In all specimens I have seen the section is either circular or elliptical. I do not claim that all adzes from the Solomon islands are alike, for I do not know of more than a few dozen in all foreign collections, and no study has been made of them in their own country. Fig. 80 shows the two commoner forms, and Fig. 81 three of the chisel form which I obtained in Hamburg from the Godeffroy collection. All are exceedingly well finished and might have been held in the hand when in use; I do not know the method of handling them. There are two adzes in the Bishop Museum of which the provenance is uncertain, and they are shown in Fig. 82. No. 3149 seems to belong to the Society islands, and it will be noticed that the sides are sloping instead of as in the Hawaiian vertical. The other one in the same figure (No. 7878) I attribute with very little doubt to New Zealand. Its main peculiarity is the transverse ridge on the face, not an uncommon feature in Maori adzes, which seems to have served to keep the handle in place.

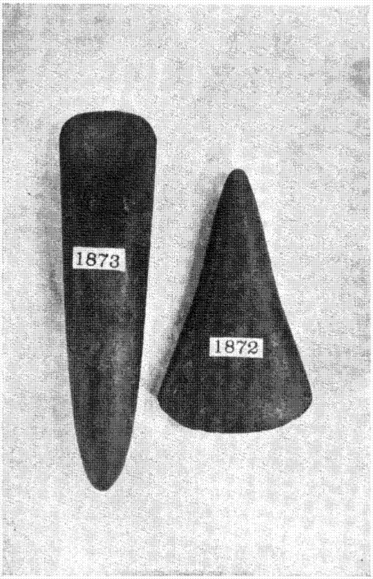

FIG. 80. SOLOMON ISLANDS ADZES.

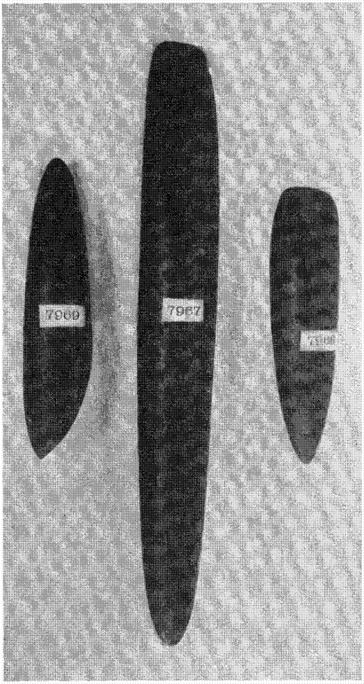

FIG. 81. SOLOMON ISLANDS ADZES.

We come now to the Maori adzes, which have been considered most closely related to the Hawaiian. In Plate LIX. are shown ten specimens of considerable variation in form, and I cannot believe that their total dissimilarity to the Hawaiian forms is due solely to the different material used in the two groups (greenstone* and phonolite). In three of the specimens (6952, 6944 and 1507) we see the angular blade already noticed in Hawaiian specimens,—in all such cases the tools are small, weighing but a few ounces. The angular tang so prominent in the Hawaiian is absent in the Maori; so are the perpendicular sides, and the edges are generally rounded, or in some cases (1504) beveled on the front side.

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*As will be seen in the table on page 86, many of these Maori adzes are made from a volcanic stone resembling phonolite but distinct from the Hawaiian variety. New Zealand being a volcanic country with a great variety of lava, including obsidian, the worked stones offer much greater diversity than on the Hawaiian group, where the volcanic ejecta are comparatively uniform.

The Moriori predecessors of the Maori, whom the latter drove from the main islands to the little group of the Chatham islands, where they are now practically extinct, had a form of adze closely allied to the Maori but presenting several peculiarities. Those shown in Figs. 83 and 84 were collected many years ago by a resident of the Chatham islands and are supposed to show fairly the forms. In the first figure the two stiff, sharp-angled stones are of a remarkably fine finish, surpassing in some respects any Pacific ocean adzes I have seen. No. 8586 is large, and even the tang is rounded to suit the cord that attached it to the handle. The front is slightly convex and the blade is consequently curved, but the other sides are true as if planed. The smaller one of the same pattern is flat on all sides. The material is a hard, brittle, steel-grey, volcanic stone. In Fig. 82 a greater variety is shown, and here there is a nearer approach to the Hawaiian. The material is a volcanic stone containing considerable masses of olivine, often colored red by decomposition. I have not recognized this stone in any other adzes, and I do not know whether it is found on the Chatham group.

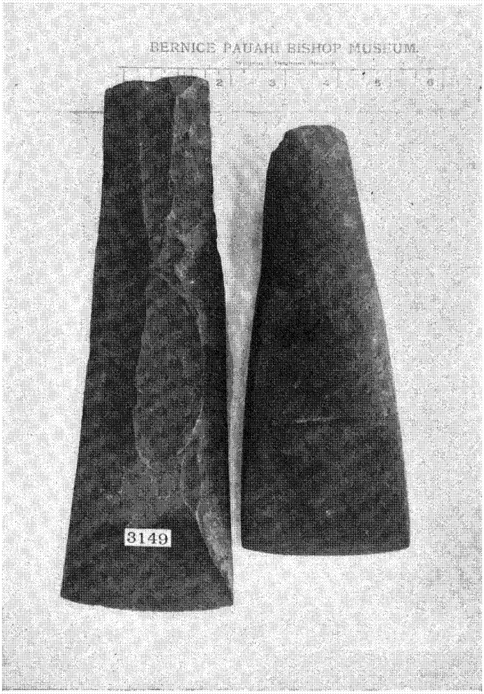

FIG. 82. SOUTHERN PACIFIC ADZES.

In Micronesia shell replaced the stone, which is not found on the low coral atolls, and the shape was comparatively uniform throughout the region making use of shell. Sometimes flat, when the exigencies of the shell demanded this starved form, but usually thick, semi-cylindrical, the edge ground toward the flat side, thus leaving a curved cutting edge as shown in Fig. 83. These shell adzes were probably as durable as stone, and they are said to be still in use on the smaller islands where there is little trade. In New Guinea the adzes were often rudely formed of a volcanic stone, or of greenstone, and in shape often approach the Hawaiian, as shown in Fig. 85, Nos. 1552 and 1553. In the same group the axe No. 1800 is of finer make.

The sizes and weights of these non-Hawaiian adzes are given in the following table:

	Number.	Length.	Cutting edge.	Weight.		Notes.
						SOLOMON ISLANDS:
FIGURE 80.—	1873.	6.5 in.	1.6 in.	.. lbs.	10.5 oz.	Greenstone; Florida.
	1872.	4.5	3.6	..	6.7	Greenstone; Florida.
						SOLOMON ISLANDS:
FIGURE 81.—	7969.	6.2	1.2	..	11	Greenstone; edge like finger-nail.
	7967.	12.6	1.2	1	12	Greenstone; edge like finger-nail.
	7968.	5.9	1.2	..	10	Greenstone; edge like finger-nail.
						SOUTHERN PACIFIC:
FIGURE 82.—	3149.	10	3.2	1	8.5	Greenstone lava; Mrs. Bishop's collection.
	7878.	8	3.1	1	9.2	Greenstone of light color; Maori.
						NEW ZEALAND:
PLATE LIX.-	6952.	3.4	1.5	..	2.5	Thin jade, angular blade, sides unfinished.
	1502.	7	2.8	1	7	Brown lava.
	1503.	13.9	2.7	7	12	Blade chipped, transverse ridge, no tang.
	1504.	8.2	2.5	1	15.5	Grey stone; sides beveled on top.
	6948.	4.9	2	..	10	Brown lava.
	6945.	6.4	1.8	1	..	Rounded on all sides; grey lava.
	6946.	5.4	2.1	..	13.5	
	6944.	3	2.1	..	5.5	Dark phonolite; angular blade.
	1507.	3.3	2.3	..	6.5	Light greenstone; blade at angle.
	6947.	5.9	2.6	4	..	Grey lava; sides beveled.
						CHATHAM ISLANDS:
FIGURE 83.—	8586.	13.7	3.9	6	7	Grey lava.
	8585.	8.5	2	1	6.7	Grey lava, flat on all sides.
						CHATHAM ISLANDS:
FIGURE 84.—	8587.	8.5	2.8	1	13	Reticulated lava with much olivine.
	8593.	2.9	1.2	..	2.7	
	8594.	2.9	1.6	..	3	
	8595.	2.3	1.6	..	3	Angular edges.
	8596.	3.7	1.9	..	5.5	Rudely finished.
	8592.	6.5	2.5	1	9	
	8588.	5.6	2.5	..	8.2	Thin.
	8589.	6	2.2	1	..	
	8590.	4.6	1.9	..	6	
	8591.	2.9	1.2	..	2.7	Thin, edge re-ground.
						MARSHALL ISLANDS:
FIGURE 85.—	7534.	11.5	4(6 circ.)	5	..	Cut from shell of *Tridacna gigas*.

Handles for the Adzes.—While this portion of our study seems to rightfully belong to the consideration of Tools and their use, it may fairly claim a place here for brief treatment, for otherwise the stone appears of little use, and the relationship of these stones is partly explained by the peculiarities of handling. To use their *koi pahoa** the Hawaiians had a handle generally of hau wood (*Paritium tiliaceum*) cut with a heel to which the tang of the stone was attached by cords of oloná or coconut fibre, a bit of kapa or dry leaf of pandanus or banana being inserted between the wood and stone.

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* While the term *koi pahoa* properly applies to the narrow sort with parallel sides like a chisel, custom has extended its use to almost all forms of stone adzes.

(No. 3101, Pl. LX.) This form shows little variation except in length or curve of handle. The hau tree is well fitted for this purpose, the wood being light and tough, and the branches naturally curved. The very name of the tree signifies "handle tree" (*he au* = *hau*).

Besides this simple form there was a more complicated one especially designed for the *poe kalae waa* or canoe makers, in which the stone blade was not fastened directly to the handle but to a tongue, which in turn was attached to the handle in such a way as to be movable on its axis and so serve for a right- or left-handed cutter (No. 3116, Pl. LX.). Among the Hawaiians this was traditionally the invention of a skilled canoe-maker, afterwards deified, Kupaaikee, who not only bequeathed his name but also his *elelo* (tongue) to this form of handle. Traditions are very pretty and interesting matters, but one must not trust much to their guidance, and in the present case we know that the people of the northern coast of New Guinea have had the same ingenious form from time immemorial, and some of the other islanders had an even simpler form for effecting the same purpose, as shown in Fig. 83, No. 1800 from New Guinea, and in c. of Fig. 84 from the Bismarck archipelago. In the New Guinea form, in my opinion the progenitor of the Hawaiian, sleeves of braided rattan are used to hold the rotating blade, while on Hawaii coconut cord serves the same purpose, the former palm not extending eastward in the Pacific. In the Caroline islands the portion to which the stone (shell) was fitted had a projection against which the head of the adze rested (Fig. 83, No. 8063), giving additional firmness. In the Marshall islands the form of the Kupaaikee adze appears rather clumsy, but the original purpose has disappeared, the blade being immovable.

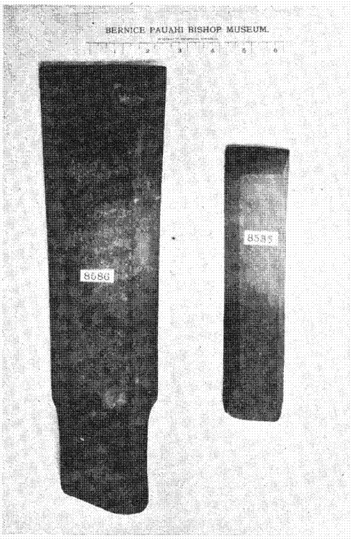

FIG. 83. MORIORI ADZES.

Laying the museums of Europe under contribution, we have in Fig. 86 some other Pacific handles. The two from New Caledonia show in a rather clumsy form the ingenious method of giving weight to the adze by a heavy block of wood, hemispherical in form, adding much to the efficiency of the tool. These handles are often in one piece, but sometimes hand-piece and socket for the blade are inserted into the block. In the specimen from the Dresden museum the blade socket can revolve in the

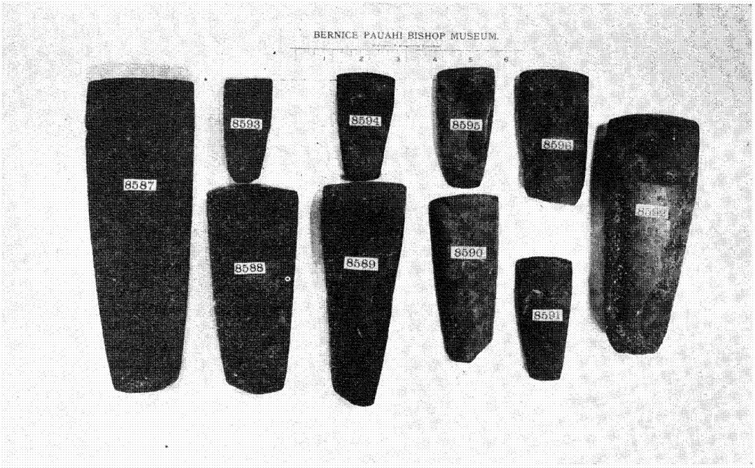
BERNICE PAUAHI BISHOP MUSEUM.
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FIG. 84. MORIORI ADZES.

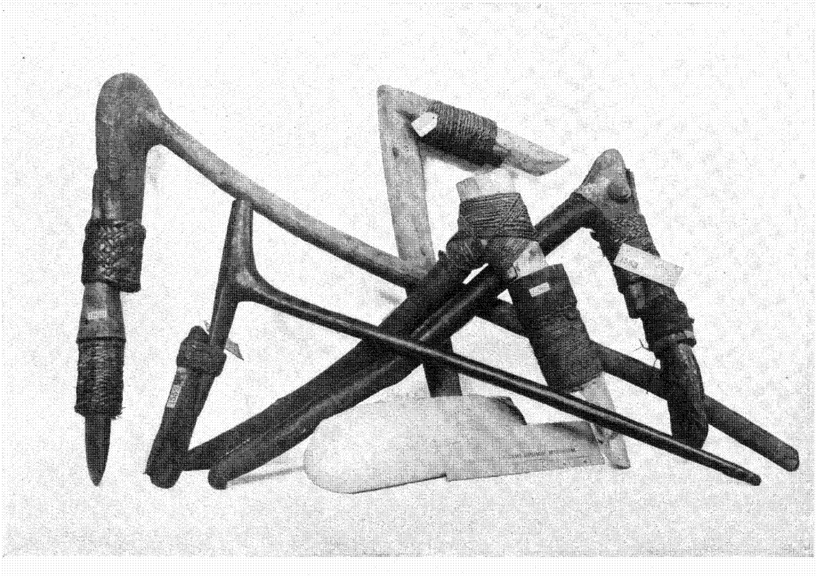

FIG. 85. HANDLES OF ADZES FROM NEW GUINEA AND MICRONESIA.

club-like handle to which it is also attached by a cord. In the Berne museum is an adze from Tahiti which seems to be the Hawaiian form reversed, and it makes a simple handle. The specimen in the Hamburg museum attributed to the Marshall islands seems to be unique and differs greatly from the ordinary handles of that group, as shown in Fig. 85; Herr C. W. Luders should, however, be well informed on the locality. The knob is the puzzling feature. In F, the specimen from the Berlin museum, we have perhaps the most primitive method of handling.

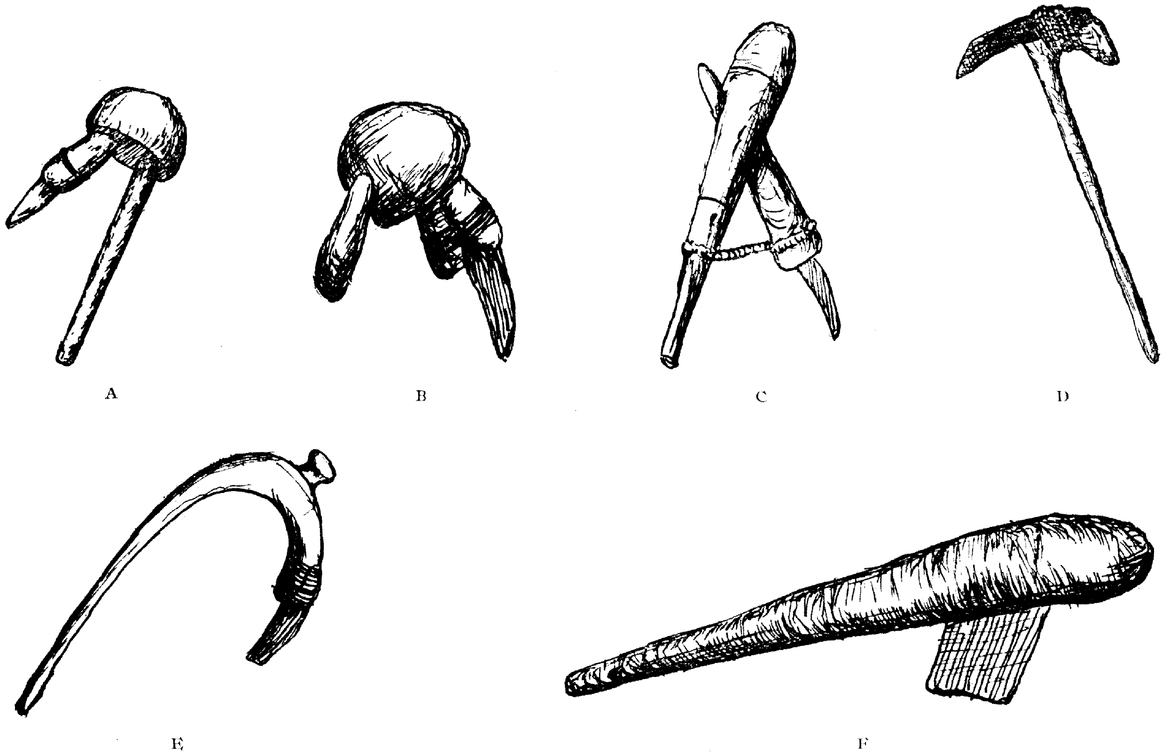

FIG. 86. VARIOUS ADZE HANDLES.

A. New Caledonia, in the Vienna Museum.
B. New Caledonia, in the Copenhagen Museum.
C. Bismarck archipelago, Dresden Museum.
D. Society islands, in the Berne Museum.
E. Marshall islands, in the Hamburg Museum.
F. Hermit islands, in the Berlin Museum.

To return to the specimens at hand: two adzes from the Gilbert islands, shown in Fig. 87, closely resemble the Hawaiian form, although the stone is replaced with shell; but I am by no means sure that these handles, which were obtained within a few years, represent the ancient form. They may have been taken from Hawaiian patterns, the intercourse between these groups having been close since the establishment of the Hawaiian Board of Missions some fifty years ago. The Maori adzes shown in Fig. 88 have been handled within twenty years, and are supposed to show the ancient form. It will be noticed that feathers are used to decorate, much as on the tomahawk of the Amerind, and these adzes or axes were used as weapons by the Maori, one or both of these specimens having been found on a famous battle field.

Another form of stone axe or adze must not be wholly passed by, the ceremonial or sacred axe from Mangaia, of the Hervey group, well represented in every large museum, and here shown in Fig. 89; and with this another, not so well known, from Duau (Normanby), of the D'Entrecasteaux group (Pl. LXI.). The Hervey islands handles are carved with great delicacy, and it is difficult to believe that they were cut with so rude an instrument as a shark tooth, but such was the case. The patterns are believed to be of a sacred nature, and their origin has been ingeniously suggested by my friend Mr. Charles H. Read, the distinguished archæologist of the British Museum.* The Duau specimens are of very different form, and have in comparison little decorative carving; the blades are flat and of jadeite; the handle of No. 1551 (Pl. LXI.) was originally ornamented with feathers. The handle of No. 1552, on the same plate, is neatly carved and a bone disk is fastened to the inner angle. In both the blades are rather insecurely attached by bands of rattan. Still another specimen of these decorated handles may be given from the stores of the Bishop Museum; it comes from New Zealand, that home of fine wood carving, and is shown in Fig. 90.

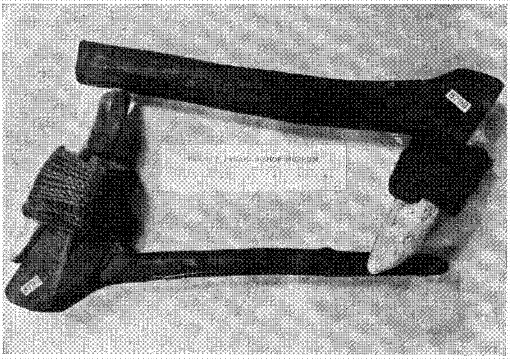

FIG. 87. GILBERT ISLANDS ADZES.

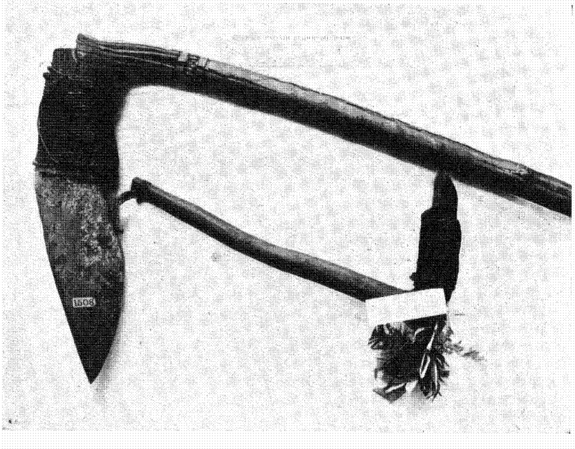

FIG. 88. MAORI ADZES.

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*On the Origin and Sacred Character of certain ornaments of the southeast Pacific. Journal of the Anthropological Institute, XXI., p. 139.

In all cases the intention seems to be to honor the stone implement rather than the temporary owner. As the warrior in mediæval times held his sword in reverence, so the artisan of the stone age regarded his principal tool as most worthy of honor.

Chisels and Gouges.—We have seen in the illustration of the adzes of the Solomon islands (Fig. 81) forms closely adapted for cutting grooves or for the more general work of a chisel, and among the ancient Hawaiians both chisels and gouges were in use during the period preceding the introduction of steel. So far as my experience goes the latter tool was more commonly formed from a marine shell (*Mitra* or *Terebra* sp.), the basal portion being ground at a suitable angle, while the tapering apical end served conveniently for a handle. The Bishop Museum has lately, however, come into possession (in a lot of material recently used in heathen practices) of a well-made stone gouge which is shown in Fig. 92. It is 5 in. long, 0.6 in. wide at the cutting edge, and weighs 3.5 oz.

About the same time Mr. Paul Hofer gave to the Museum the finest stone chisel that I have ever seen. This is shown in Fig. 91, and is 6.8 in. long, weighs 7.7 oz., and has a cutting edge of 0.5 in. Of a form suitable for holding in the hand it must have been a serviceable tool for carving images or the like, and certainly required no handle. It has been carefully ground on all sides in such a way that it

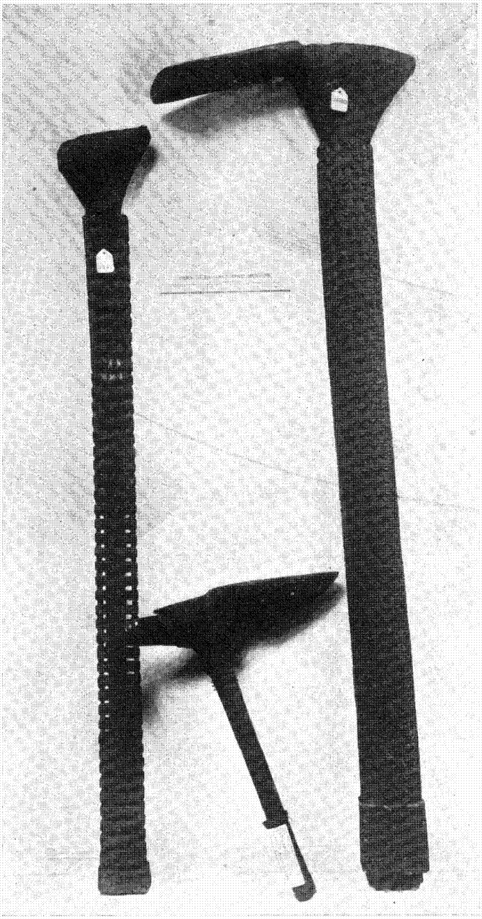

FIG. 89. CEREMONIAL ADZES FROM MANGAIA.

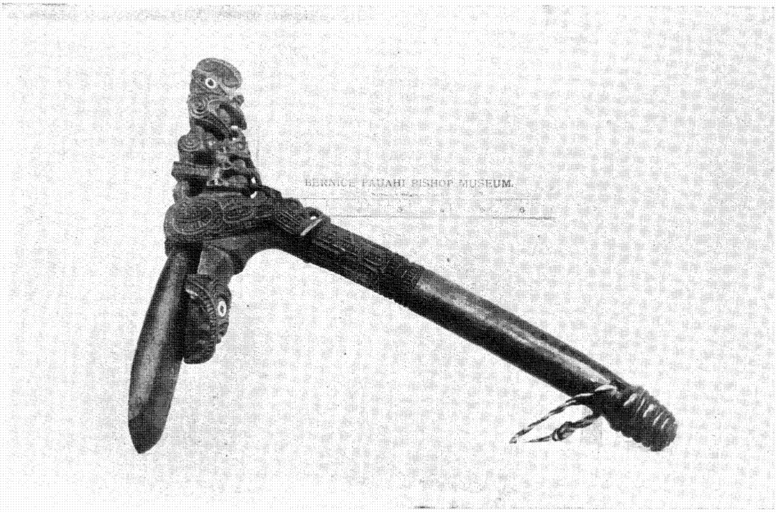

FIG. 90. MAORI CARVED ADZE HANDLE.

tapers to each end. Doubtless buried in a moist place for many years its present surface much resembles rusty iron. Another gouge in the collection (No. 4555) is 3.5 in. long, 0.6 in. wide at cutting edge, and weighs only 2.2 oz. It is ground smooth and well rounded, and with the gouge shown in Fig. 92 seems to have been used in carving the large idols. At least the curved edge exactly fits the interior curve of the nostrils in two of the large idols in this Museum. The smaller gouge must have required some sort of handle, as it is too short to hold firmly in the fingers.

Stone Figures.—Of the few animals that fell under the observation of the ancient Hawaiians the dog and pig were by far the most cherished, but I have never seen any image either in wood or stone of these domestic animals, and neither was raised to the dignity of a god, although the deified hero Kamapuaa was half hog half man. Was the totemistic idea too powerful to admit of deifying the limited articles of animal food and so banishing them from the larder? With certain fish the case was different, and the Shark god was one of the most powerful of the minor deities; hence probably we have a number of more or less accurate representations both in wood and stone of these dreaded fish. Two that are in the Bishop Museum are shown in Fig. 93. It is curious that in the southern Polynesian islands representations of fish, or at least of fish as divinities, were extremely rare, and yet the harvest of the sea was quite as important to the southern people as to their brethren dwelling north of the equator.

A fabled lizard of great size was one of the "properties" of the Hawaiian folklore, and to this day dread of this dragon-like monster is rife among the people. While drawings of the *Moo* or lizard exist, I do not recall any carved figure of one. In bone we have figures of shells, and even rude skulls of enemies, but all these are small and belong to the chapter on Ornament. Far more important are the anthropomorphic figures still extant that show the sculptor's powers most fully. Wood was of course the most pliant material for the plastic work, but most of the idols of this material perished in the flames of the iconoclastic reformers of 1819. The few that survive in the museums of the world have been photographed for the chapter on Hawaiian Wor-

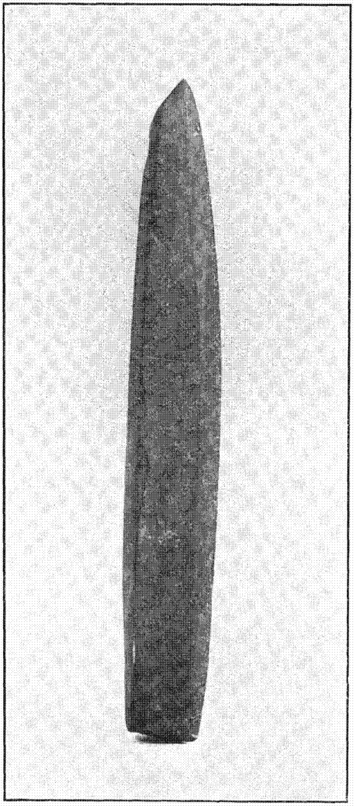

FIG. 91. STONE CHISEL

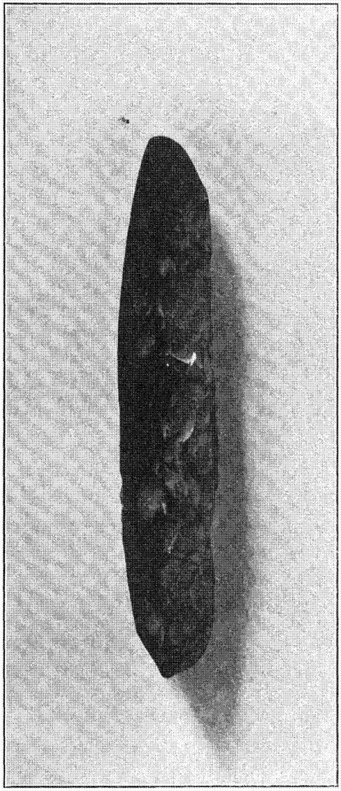

FIG. 92. STONE GOUGE.

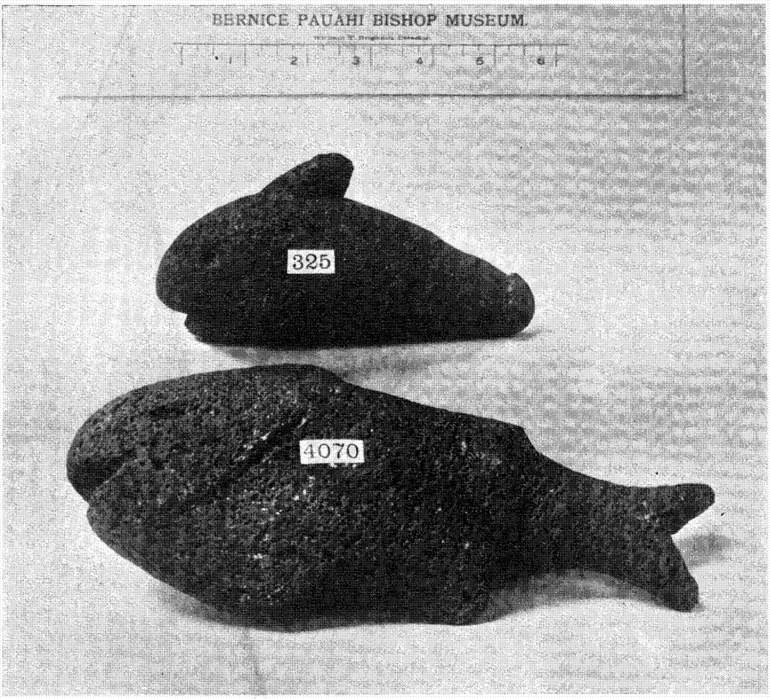

FIG. 93. STONE IMAGES OF FISH GODS.

ship; but the image makers used stone as well as wood, and of these some have survived, and a few may be here noticed as works of stone, although their religious significance will be treated more fully in another chapter. The oldest form as it appears to me is the unhewn stone with the face of a human being sketched rudely on one end. Even wooden idols have survived with no more shaping than this, and that the face or head was not always considered necessary we see by the sketches of Dr. William Ellis* and others, where a post rounded and decked with kapa makes a perfectly satisfactory god so far as appears. A capital type of this rude stone form is shown in Pl. LXIV., a stone of great weight which stood, when I first saw it (1864) at the gate of a gentleman's premises in Kahuku, Oahu. Even in its fallen state it had its votaries, and I have seen natives treat it with great respect, even making offerings of leaves. It was 50 inches high. After the death of the then owner and the absorption of the residence by a sugar plantation this image and its companion, which will presently be described, were taken to Frankfort-on-the-Main by a German resident of Honolulu. This gentleman afterwards died, and hearing that the images were lying uncared for in their late owner's courtyard, in 1896 while in Germany, I hoped to be able to restore them to their native country. I was three months too late, for on entering the great museum in Berlin I found they had recently secured a permanent resting place there. Dr. Bastian, however, kindly had casts made which are, by the courtesy of the German Government, now in the Bishop Museum, and from these I have made the illustrations, Pl. LXIV., and Fig. 94.

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* This was not the missionary of the same name often quoted in this chapter, but the assistant surgeon to both vessels during Cook's third voyage, and the author of a very good account of the voyage.

The other image is not an idol (in the popular sense) but a portrait bust, and it was first known to the white population of the islands when it stood in the valley of Manoa, near Honolulu. It is claimed that it was there before Cook's arrival at Kauai (1778). The ruff, wig and cue suggest a Spanish portrait of the time of the early Spanish discoverers. Whether it was an attempt on the part of a native sculptor to represent the white strangers, or whether some Spaniard of Juan de Gaetano's crew made it as a memorial of their visit, I cannot say. The workmanship is much the same as on other stone images undoubtedly Hawaiian, and the owner in 1864, who was a gentleman of education and especially versed in Hawaiian legendary lore, always believed that it was of Hawaiian workmanship and very ancient. The front and profile are shown in Fig. 94. The bust is 32 inches high. It is the only portrait I have seen, for the usual idols are not "likenesses of any form that is in Heaven above, or that is in the Earth beneath, or that is in the water under the earth".

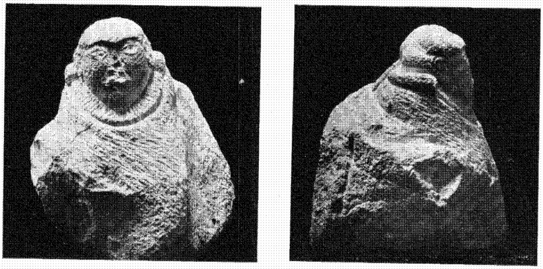

FIG. 94. IMAGE FROM MANOA VALLEY.

I have mentioned the images found on Necker island of the Hawaiian group in connection with the stone bowl (Fig. 53) found with them. They were all broken in pieces, but some of them have been repaired* and are shown in Pl. LXII. It will be seen that there are two distinct types, one made of cellular lava, and with a coarse treatment of arms and legs; the other of finer stone and more reasonable treatment. The heads in all of them spring from the breast without necks; they are large and and have enormous ears. The profile, Fig. 95, is of image No. 7447, Pl. LXII. We

*The repairing consists solely in cementing together the ruptured parts. No additions have been made. Why, if the object was to destroy these images, they were simply broken and left on the ground it is difficult to understand, for it would have been easy to have thrown the fragments into the sea without moving from the spot where they were left.

know nothing of what they were intended to represent. Several small objects have been put together in Fig. 96. No. 4488 is an implement of unknown use, perhaps a whetstone. The clinkstone of which it is made is very compact and metallic in appearance. No. 5312 is a small rudely made disk, of which other specimens are shown in Fig. 97. There is a slight concavity on each face, and a perforation in the middle to unite these depressions, and the natives usually call such stones *pohaku hu*, or a stone for a top. In Fig. 97, No. 4681 is doubtless such a stone, as it is round and suitable for fastening to a spindle, and No. 4682 in the same figure would also make a fair top; but the two irregular specimens, No. 5312 and No. 4683 (Fig. 97), could hardly serve that purpose. They have been used in modern times, and so far as I know, formerly as well, as part of a snare to catch birds. A loop of fine cord is passed through the central hole and covered with bait, while the snarer leads the cord to some cover near by. A pull at the right time may catch the leg of the bird in the loop and the weight of the stone prevents flight. No 7454 is a peculiar and well finished sinker for a squid or turtle hook. The Bishop Museum has lately acquired another specimen still attached to the spindle, explaining the use, before unknown to me. No. 4064 is a neatly made stone

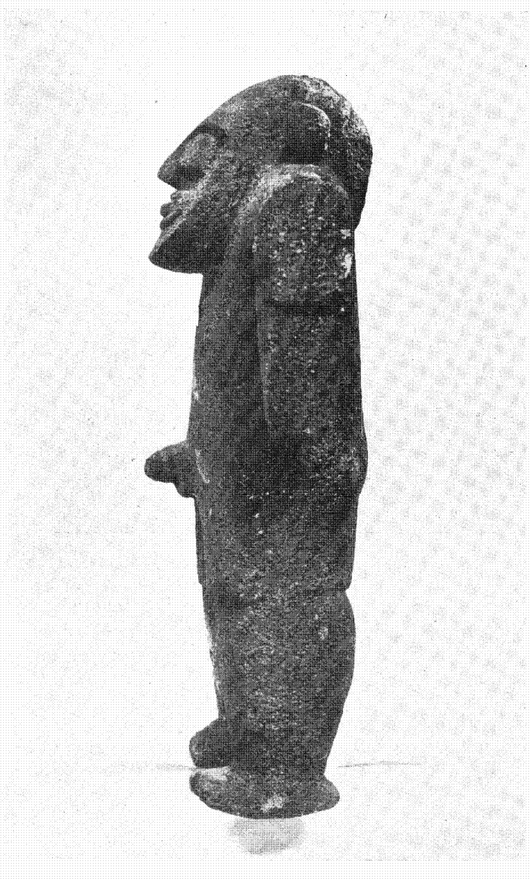

FIG. 95. NECKER ISLAND IMAGE.

helmet worn by a small idol. It is hollow and has a small hole in the rim, apparently to fasten it on with. But the idol could not be obtained at the time the helmet was purchased and now it has disappeared. I do not believe that the top was of considerable antiquity on these islands, although small ones made from a kukui nut are not uncommon among children's toys. The irregular stones could be and no doubt were used for net sinkers.

I have not described the stone structures of the old Hawaiians because they were of rough stone, dry laid, and consist of pyramidal and enclosed temples which will properly be considered with the Ancient Worship, and extensive walls enclosing fish preserves on the fringing coral reefs, which belong again to the Fisheries. In both these stone works it was the great labor expended in collecting, transporting and placing the stones rather than any architectural skill that made them noteworthy. In the case of the Kohala heiau it is claimed that fifteen thousand men formed a line and passed the stones more than seven miles over very hilly and uneven ground, never allowing the stones to touch the ground in their journey. From what I know of the old native character I can believe this statement.

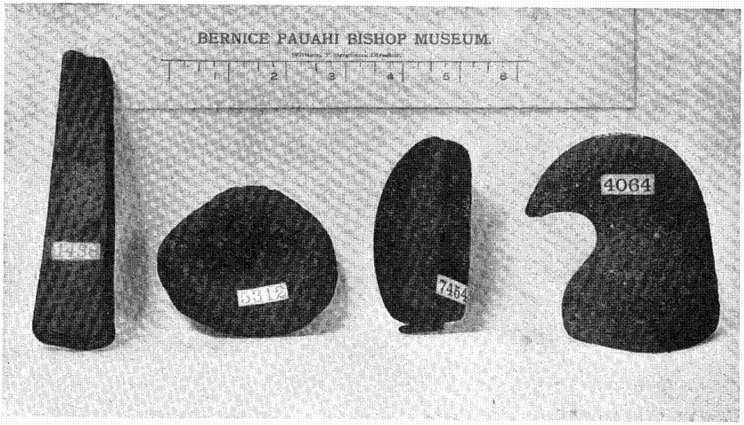

FIG. 96. MISCELLANEOUS STONE OBJECTS.

The stone walls of the heiau often tumbled down on Hawaii in the frequent earthquakes, but I do not know that they were ever made the objects of the victor's destroying wrath in the interminable petty wars, while the walls of the fish ponds were usually broken down to let out the fish and so materially injure the conquered owners.

In the remarkable temple of Umi on the desert plains of Hawaii, seven thousand feet above the sea, the huge pyramids of stone remain to this day as monuments of the devotion and industry of Chiefs, priests and the men of the districts of the island. On the other hand what the heathen conquerer spared the "civilized" white man has wantonly destroyed, for a heiau near Honolulu that in 1880 was in a most interesting condition has since been ground up in the rock-crusher to make roads, and no stone is left to mark the place!

Cut stones for building purposes were rare, and in all cases they were shaped from slabs of lava by patient hammering. One of the flat stones (No. 4899), formerly surrounding the altar in a small fishermen's heiau on top of a steep volcanic cone overlooking the sea at Kapoho, on the eastern coast of Hawaii, is in the Bishop Museum. Its dimensions are: length 48 in., width 26 in., and thickness 4.5 in. Some cut stones of a very different sort have been found at Kailua, on the same island, buried in the sands of the beach, of which the original intent remains in doubt. They are called the *pohaku kalae* (cut stones) of Umi, and are said to have been brought on double canoes from some unknown quarry along the coast probably now covered by some of the many lava flows of that region. One belonging to the Bishop Museum is 6 ft. long, 2 ft. wide, and 13 in. thick. Could they have been used for landing-stones or wharves for the royal canoes on that sandy beach? They were well cut, and of a size and weight difficult to handle by simple muscular strength.

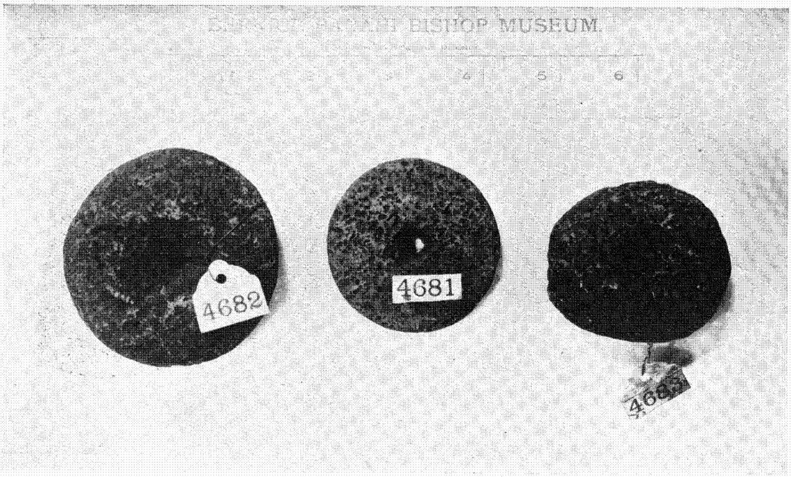

FIG. 97. TEETOTUM STONES.

Before closing this brief chapter on Hawaiian wrought stones I may mention the stones found in several places, known as bell-stones from their great resonance.

Of these the best example is on the road to Kaimuki district near Leahi, on Oahu. They are simply large stones supported on three or four smaller ones and their vibrations are excited by beating with small stones. I cannot find that the old Hawaiians made much of these stones. Another remarkable stone found also in the same region (and elsewhere) has one of its surfaces scored so deep and in so clear a manner by volcanic action as to suggest inscriptions, and images of runic staves or Etruscan stelæ arise in the imagination of the antiquary. They are Nature's handiwork, not man's, and to the same category must be assigned the stones here marked with comparatively large depressions, of distinct hemispherical form, often quite as definite as similar markings seen in Europe on stones forming part of prehistoric tombs: they are here only the remains of bubbles in the lava. Not infrequently has my attention been called to these as doubtless ancient games of the Hawaiians.

Genuine inscriptions, however, do exist on the Hawaiian islands, in caves, on exposed stones, and on lava flows where considerable flat surface is presented. Of these pictographs many have been collected, some photographed, and some cast, and they are now being studied with a view to future publication. They range from a simple glyph to record the important fact that the sculptor had completed the circuit of the island, Hawaii for example,—a feat as difficult in ancient days as a pilgrimage from Damascus to Mecca,—to curious conventionalized figures of men (or devils) and animals. Until these have received further study no question of their date or origin need be raised. They are found on all the principal islands from Kauai to Hawaii, and are of similar character throughout the group.

Any one who has had the patience to read this chapter through and to examine the many illustrations will be struck with the entire absence of surface decoration. Not a fret nor a guilloche, not even lines or dots are used on the surface of stone dishes or implements to relieve the primitive roughness! Even the stone images (except the Manoa bust, which shows foreign influence) are devoid of the slight ornament of clothing, and if their stone work alone survived, the ancient Hawaiians would not have any standing among decorative tribes. The Papuans and Melanesians, so much their inferiors physically and mentally, would rank far above them in ornamentation. We must have patience until the patterns of their kapa can be shown, and the decoration of their gourd vessels, when it will, I think, be shown that they appreciated decoration if they were not adepts in the higher forms. In the beauty of pure form as shown in their feather helmets and in the best of their ancient *umeke* they yield to none. Perhaps if they had made pottery in place of working intractable stone the result might have been different. The wonderfully decorative carving (on wood) of the Maori and the Mangaian, both of the same family with the Hawaiian, show what the Polynesian can do when his faculties are turned in that direction.

We are able to see how in the possible twelve centuries that the Hawaiians have been on this group they utilized the stone for their daily needs, until at last the stranger from distant lands brought metals, pottery, and the loom, supplanting the rude tools and their imperfect products, until only the whetstones and poi pounders retain their place in the native armamentarium. How few the stone implements retained by the most civilized peoples! The mechanic uses his grindstone and whetstone, the latter not very different from the most primitive form, and the chemist clings to his agate mortar, as the cobbler to his lapstone, but little else is left; even the millstones are yielding place to hardened steel rollers for the comminution of cereals. With all this change, improvement doubtless, the stone implements of a people without a written history are the remaining link to connect us with their past.

"O there are voices of the Past,
Links of a broken chain,
Wings that can bear me back to Times
Which cannot come again:
Yet God forbid that I should lose
The echoes that remain!"

Ordered printed November 8, 1901.

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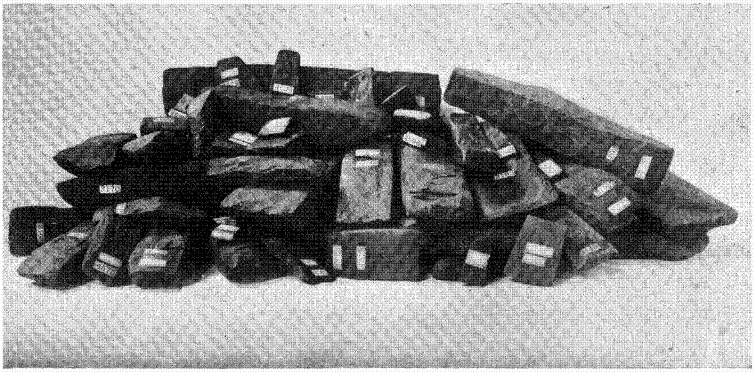

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83. Moriori Adzes 87
84. Moriori Adzes 88
85. Handled Adzes from New Guinea 88
86. Various Adze handles 89
87. Gilbert islands Adzes 90
88. Maori Adzes handled 90
89. Ceremonial Adzes from Mangaia 91
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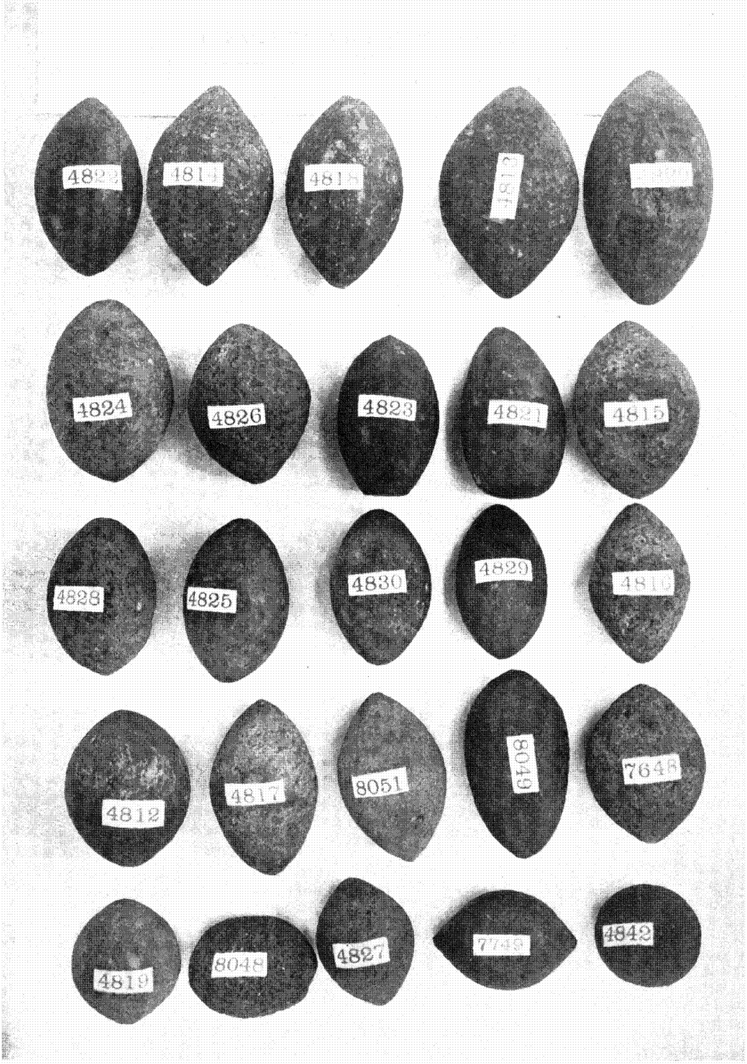
MU

PLATES.

PLATE XXXI.

HAWAIIAN SLINGSTONES.

4822.	Compact brown lava.
4814.	Brown lava.
4818.	Smooth finish.
4813.	Compact lava.
4820.	Pecking marks very plain.
4824.	Grey, clay-like.
4826.	Red, porous lava.
4823.	Clay with the end ground off.
4821.	Clay like last.
4815.	Rolled lava.
4828.	Very cellular lava.
4825.	Clay-like.
4830.	Cellular lava.
4829.	Smooth, flattened on side near one end.
4816.	Rough, red, rolled.
4812.	Brown, smooth lava.
4817.	Grey, flat on one side.
8051	Ground but not polished.
8049.	Very irregular.
7648.	Rough, tufa-like.
4819.	Lava.
8048.	Black cellular lava.
4827.	Lava.
7749.	Flattened.
4842.	Round, rough; perhaps a Noa stone.


4822
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8051
8049
7648
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8048
4827
7749
4842

HAWAIIAN SLINGSTONES (MAA).

PLATE XXXII.

Hawaiian Polishing Stones.

7937. Pohaku oio; flat face and conical back; 4.2 lbs.

3013. Polishing stone of ordinary shape and texture.

3001. Pohaku oio for polishing canoe or umeke. Maui.

3010. Pohaku oio anai. Fine polishing stone.

3026. Of the same character as the last.

3022. Pohaku oio anai.

3002. Pohaku oio anai.

3009. Pohaku pahoa oio anai umeke laau. For polishing umeke.

3065. Oahi. Baked pumice from the beach of Niihau. Obtained in 1885.

3062. Puna. Smooth white coral.

3068. Pohaku oio anai.

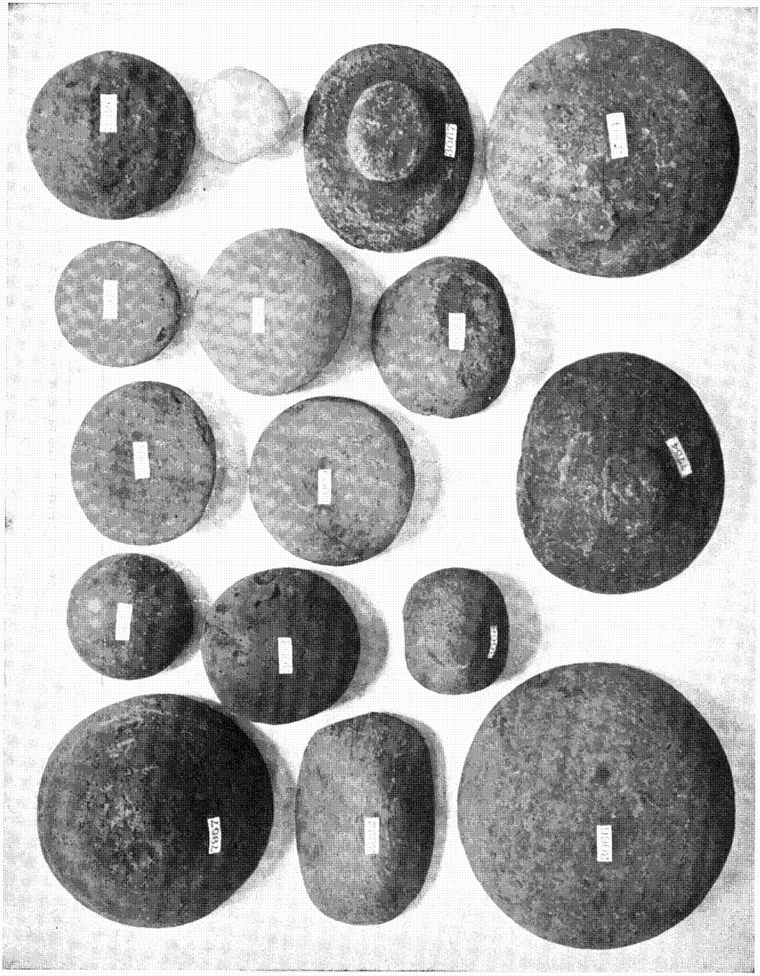
3031. Pohaku oio anai.

3067. Pohaku oio anai with knob; elliptical outline.

3066. Pohaku oio anai from Kailua, Hawaii.

7754. Polisher with flat face, conical back with knob, 3.5 lbs.

3004. Pohaku pahee anai ipu laau. Kailua, Hawaii.

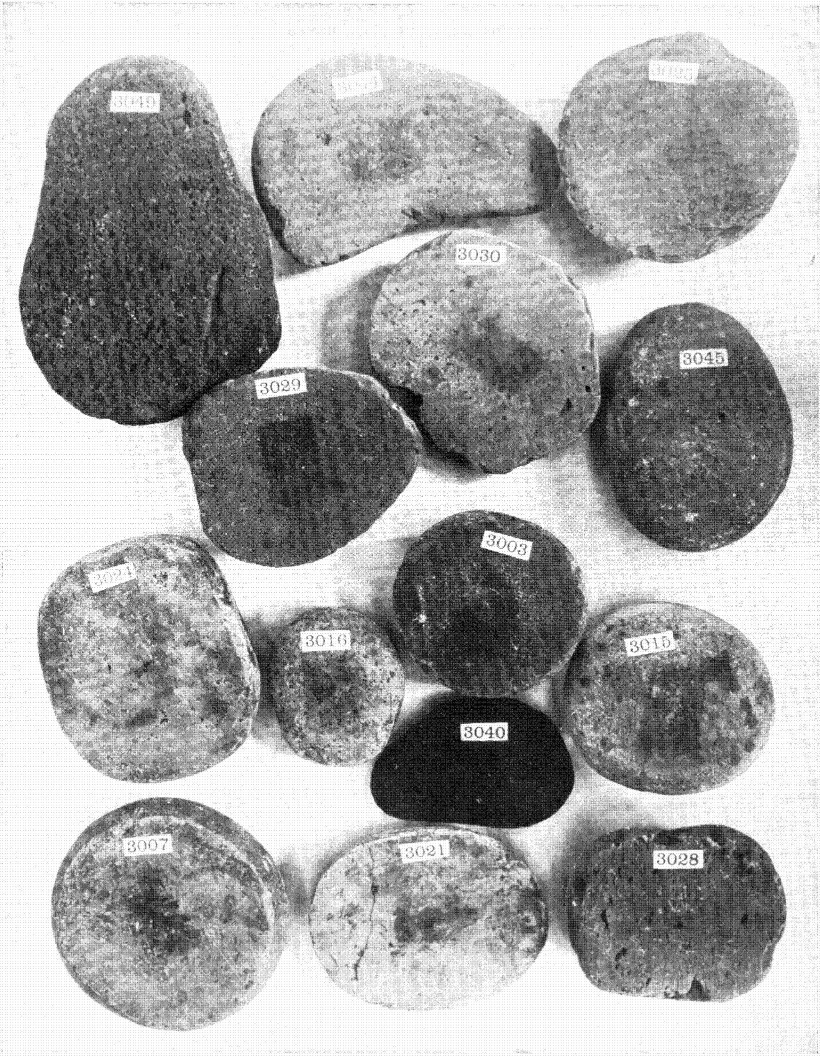


HAWAIIAN POLISHING STONES.

PLATE XXXIII.

Hawaiian Polishing Stones.

3049. Rough, cellular, fresh lava rasp.
3044. Rough lava rasp.
3025. Truncated cone smooth polisher.
3029. Cellular lava of uniform texture, back rounded.
3030. Smooth calcareous conglomerate.
3045. Fine coral sandstone.
3024. Fine grain with occasional cells; canoe polisher.
3016. Cellular light colored stone.
3003. Hemispherical, smooth.
3040. Black rough lava crust. Much used for rough work.
3015. Rude canoe polisher.
3007. Lenticular mass, one side worn flat.
3021. Smooth, well worn polisher for canoes or umeke.
3028. Stone with large, irregular cells like rotten stone.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3003
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3016
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3007
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3028

HAWAIIAN POLISHING STONES.

PLATE XXXIV.

HAWAIIAN POLISHING STONES.

3005. Fine-grained hemispherical polisher.

3046. Pumice with two used surfaces at right angles to each other.

3043. Rough porous lava.

3053. Pieces of black cellular lava crust.

3014. Smooth calcareous polisher.

3006. Smooth hemispherical polisher.

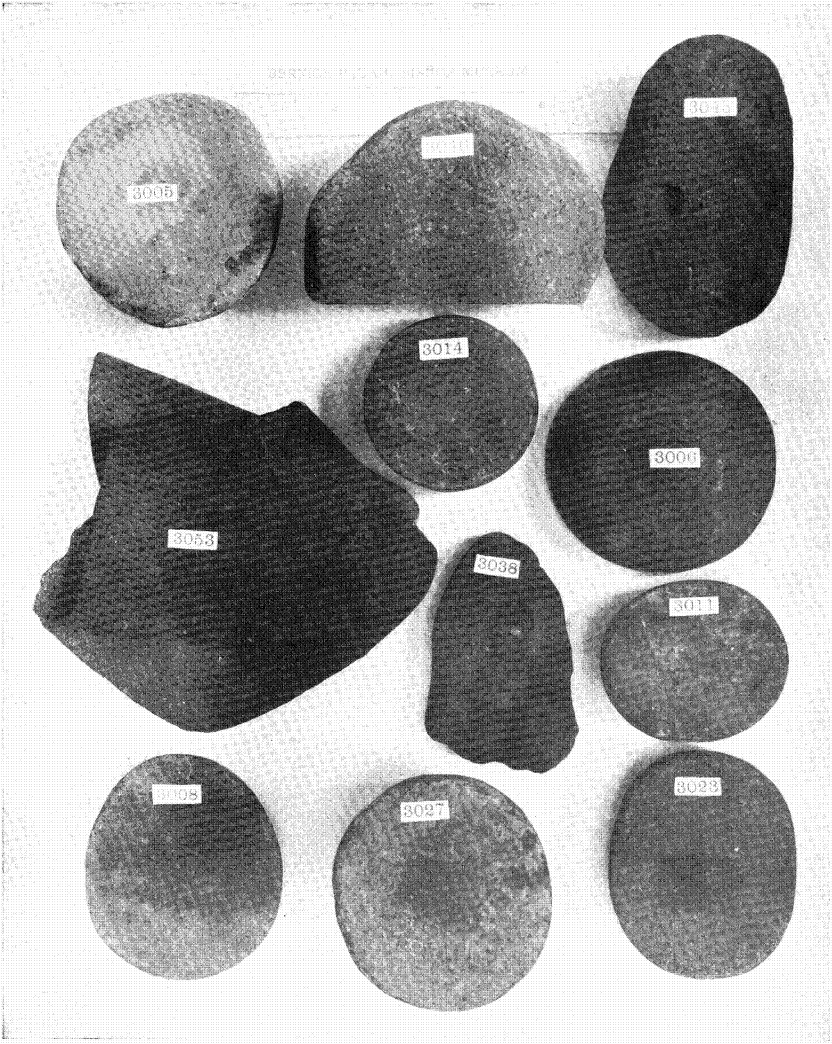
3038. Very hard and smooth lava for whetstone.

3011. Half of a prolate spheroid, smooth grain.

3008. Flat surface, rounded back, rough grain.

3027. Hemispherical, cellular canoe polisher.

3023. Close-grained, rounded back polisher for canoes.

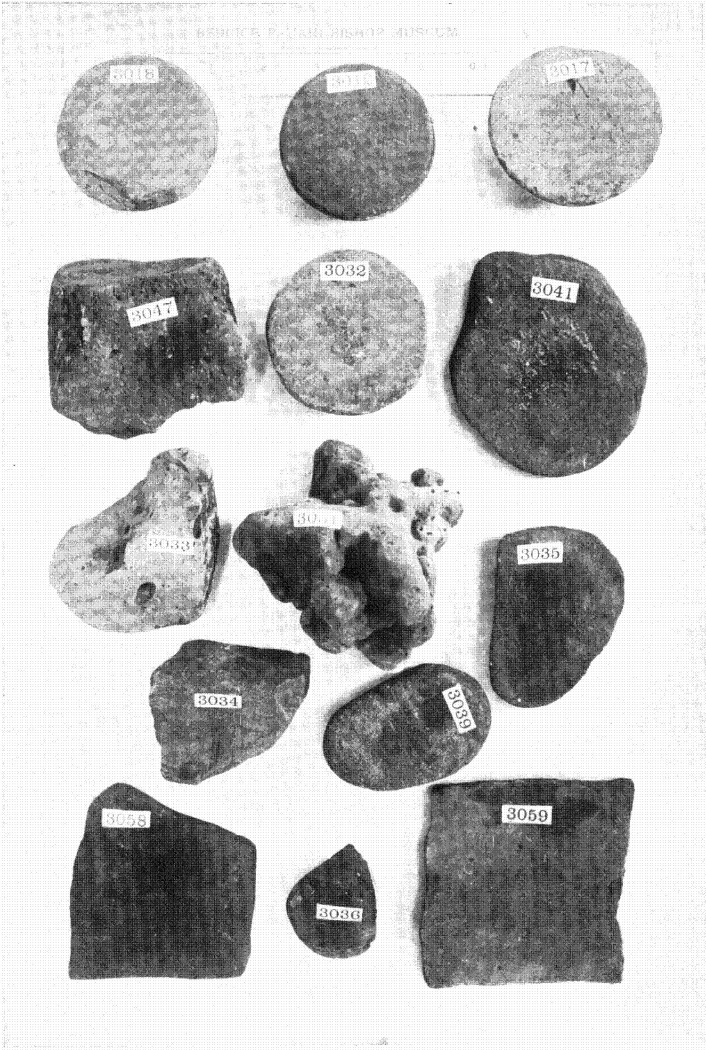

3005
3014
3006
3053
3038
3011
3008
3027
3023

HAWAIIAN POLISHING STONES.

PLATE XXXV.

HAWAIIAN POLISHING STONES.

3018. Calcareous conglomerate, hemispherical form.
3012. Hemispherical, compact.
3017. Lava, round on back, nearly flat on face.
3047. Pumice with marks of use on four sides.
3032. Lava with crystals of augite; truncated cone.
3041. Rude, shapeless piece of lava.
3033. Curious cellular fragment resembling burstone.
3051. Fragment of coral softer than pumice.
3035. Pumice nearly worn out.
3034. A very composite stone full of minute crystals.
3039. Coral of considerable solidity.
3058. Plate of lava crust.
3036. Pumice for rounding the insides of umekes.
3059. Thin, tile-like fragment of compact lava smooth on both sides.


3018
3017
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3041
3033
3035
3034
3039
3058
3059
3036

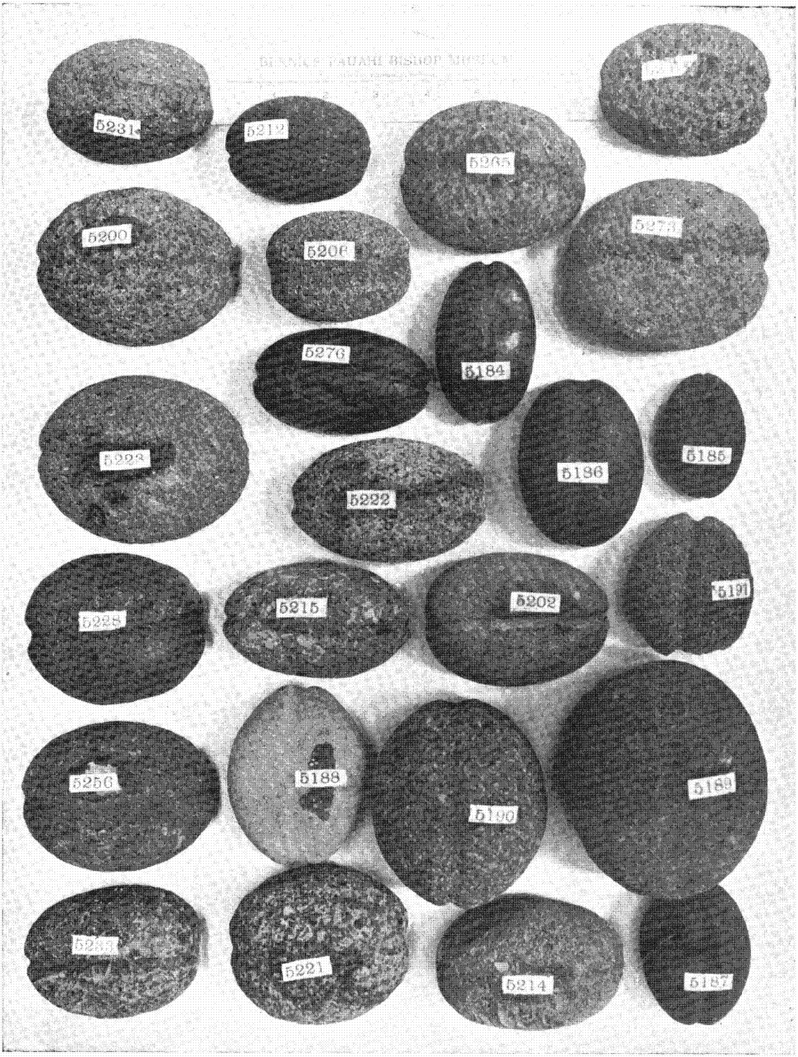
HAWAIIAN POLISHING STONES.

PLATE XXXVI.

HAWAIIAN SQUID-HOOK SINKERS.

I cannot vouch for the identification of all the specimens. They are often foreign stones taken from the ballast of some vessel, and there is no petrological collection for comparison within two thousand miles.

5231. Coral sand rock.
5212. Hematite.
5265. Crystalline granitoid rock.
5240. Crystals of pyroxene in lime.
5200. Augite crystals in white matrix.
5206. Coral sand rock.
5184. Hematite.
5273. Coral sandstone.
5223. Augite, olivine, quartz, etc.
5276. Hematite.
5222. Granite from Hongkong(?).
5186. Hematite and olivine.
5185. Hematite.
5228. Yellow ochre.
5215. Coral conglomerate.
5202. Coral conglomerate.
5191. Coarse coral sand rock.
5256. Granitoid stained with iron.
5188. Fine white coral sand rock.
5190. White crystals in dark green matrix.
5189. Augite, olivine, etc.
5233. Coral conglomerate.
5221. Granite from Hongkong(?).
5214. Coral conglomerate.
5187. Hematite.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5212
5265
5200
5206
5273
5276
5184
5223
5222
5186
5185
5228
5215
5202
5191
5256
5188
5190
5189
5233
5221
5214
5187

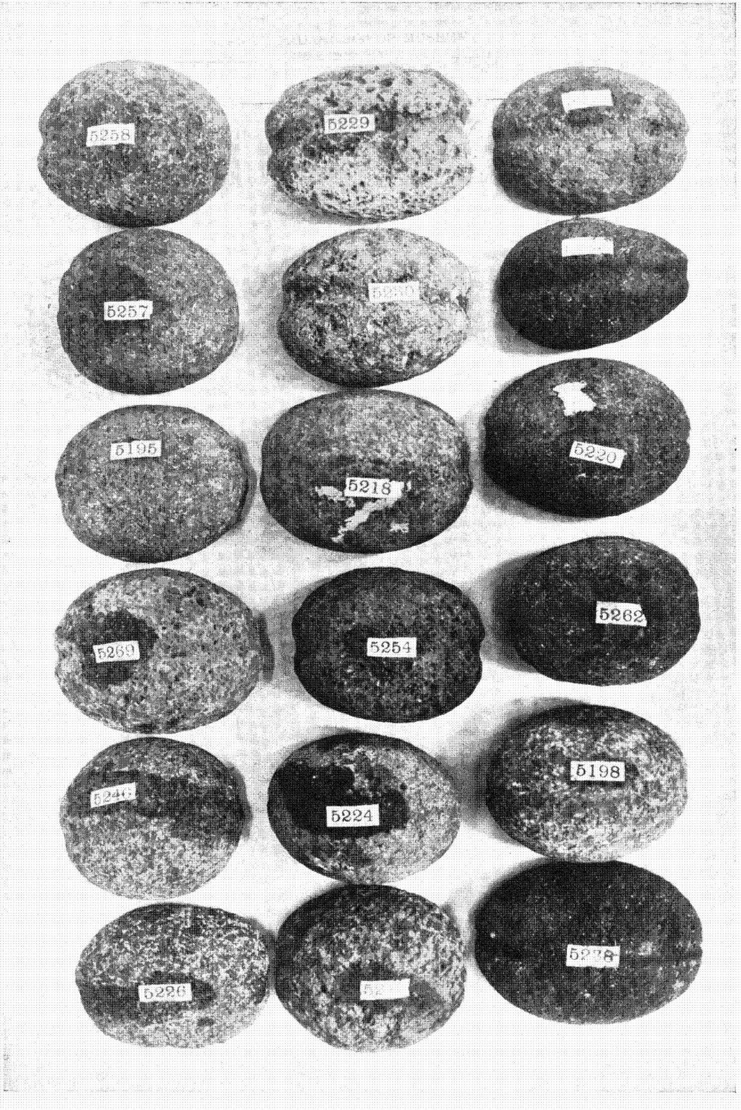
HAWAIIAN SQUID-HOOK SINKERS.

PLATE XXXVII.

HAWAIIAN SQUID-HOOK SINKERS.

5258. Volcanic nodule.
5229. Coarse coral rock.
5264. Dark crystals in white matrix.
5257. Same as last specimen.
5230. Coral rock.
5241. Decomposing crystals, red matrix.
5195. Volcanic nodule.
5218. Rose granite.
5220. Volcanic nodule.
5269. Coarse metamorphic rock.
5254. Olivine lava.
5262. Reddish crystalline rock.
5246. Granitoid rock.
5224. Granitoid rock.
5198. Dark crystals in white matrix, heavy.
5226. Olivine almost entirely.
5245. Dark crystals in white matrix.
5238. Volcanic olivine, pyrite, etc.

By the term volcanic nodule I mean certain masses of undetermined composition extruded from the slowly moving lava flows. They are often hematite, olivine, ochre or a mixture of these and augite, and are often several inches in diameter.

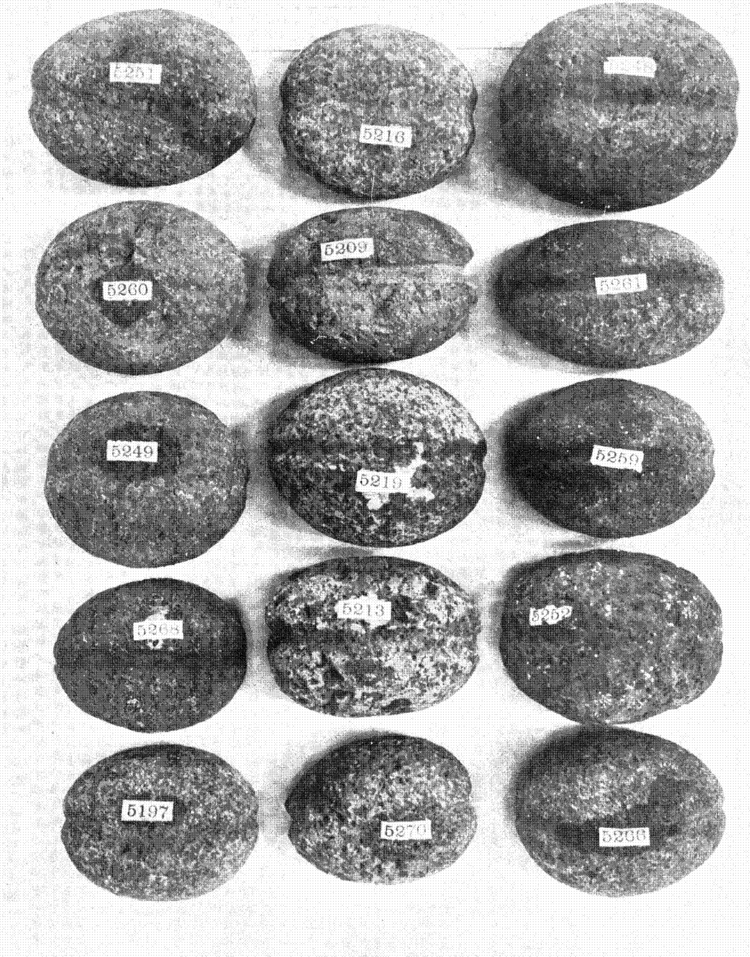

5258
5229
5257
5230
5195
5218
5220
5269
5254
5262
5246
5224
5198
5226
52
5278

HAWAIIAN SQUID-HOOK SINKERS.

PLATE XXXVIII.

HAWAIIAN SQUID-HOOK SINKERS.

5251. Volcanic nodule.
5216. Dark crystals (? hornblende) in white matrix.
5248. Volcanic nodule.
5260. Volcanic nodule.
5209. Coral sandstone.
5261. Granitoid rock.
5249. Volcanic nodule.
5219. Granite, from Hongkong.
5259. Crystalline stone.
5268. Containing much olivine.
5213. Coarse coral rock.
5252. Reddish lava.
5197. Rose granite.
5270. Coarse granite.
5266. Crystalline stone.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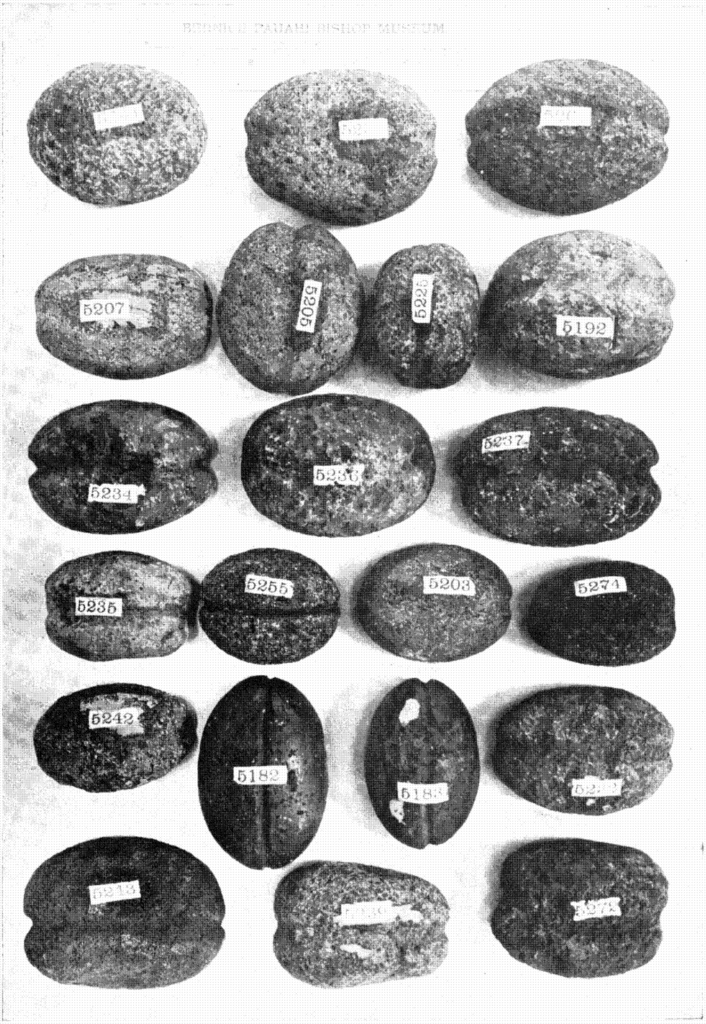
5216
5260
5209
5261
5249
5219
5259
5268
5213
5252
5197
5270
5266

HAWAIIAN SQUID-HOOK SINKERS.

PLATE XXXIX.

Hawaiian Squid-hook Sinkers.

5244. Dark crystals in white matrix.
5253. Volcanic nodule; olivine, augite, etc.
5267. Volcanic nodule.
5207. Coral rock.
5205. Semifossil coral.
5225. Dark crystals in white matrix.
5192. Coral rock.
5234. Coral conglomerate.
5236. Coral, baked.
5237. Coarse coral rock.
5235. Coral, baked.
5255. Olivine lava.
5203. Coral rock.
5274. Volcanic augite crystals, some olivine, heavy.
5242. Shell and sand conglomerate.
5182. Hematite.
5183. Hematite.
5232. Coral rock.
5243. Cellular lava.
5239. Tufaceous stone.
5272. Lava containing much iron.


BERNICE PAUAHI BISHOP MUSEUM
5207
5205
5225
5192
5234
5236
5237
5235
5255
5203
5274
5242
5182
5183

HAWAIIAN SQUID-HOOK SINKERS.

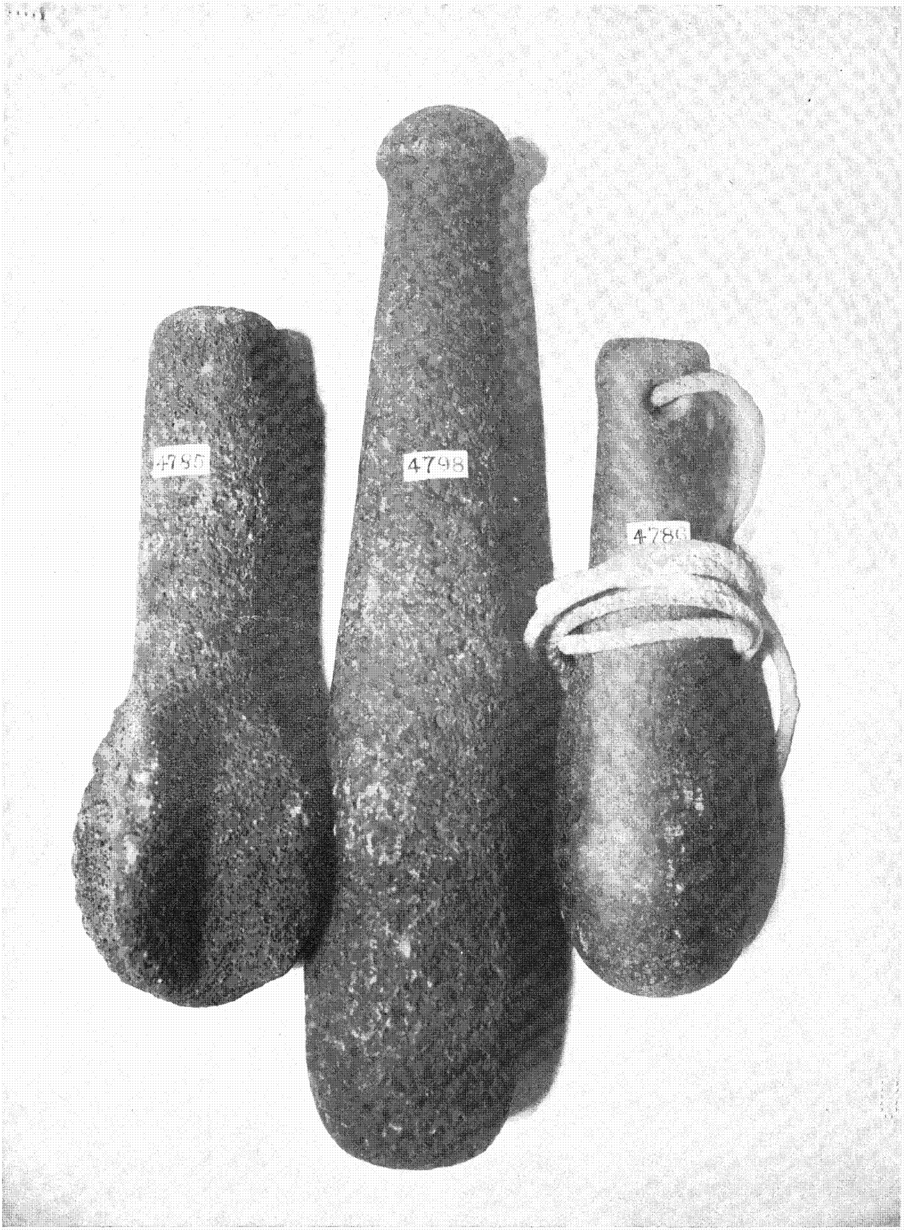
PLATE XL.

HAWAIIAN STONE CLUBS.

4785. Cellular lava with four wings and a hole drilled in handle; 9.5 in. long, weighs 3 lbs. 3.5 oz.

4798. Cellular lava, pestle-like; 14.7 in. long, weighs 6 lbs. 6 oz.

4786. Compact lava, well-drilled hole in handle; 9 in. long, blade 3×2.2 in., weighs 2 lbs. 14.5 oz.


4785
4798
4786

HAWAIIAN STONE CLUBS.

PLATE XLI.

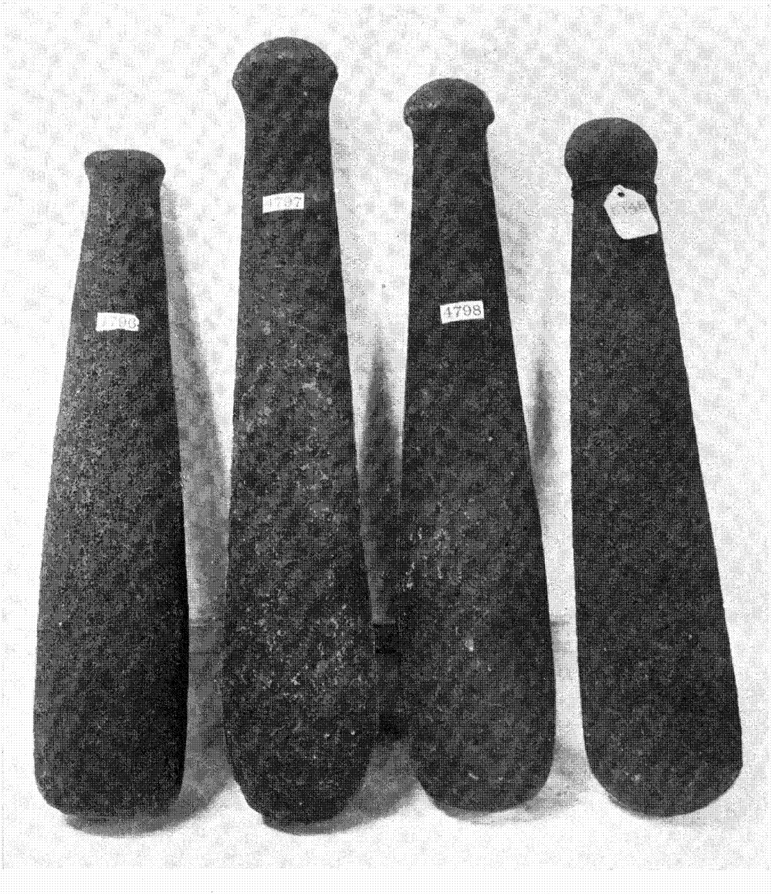
Hawaiian Pestles.

4796. Cellular lava; 13.2 in. long; weighs 4 lbs. 2 oz.

4797. Cellular lava; 15.8 in. long; weighs 6 lbs. 9 oz.

4798. Cellular lava; 14.7 in. long; weighs 6 lbs. 6 oz.

5148. Cellular lava; 13.8 in. long; weighs 4 lbs. 5 oz.


4796
4797
4798

HAWAIIAN STONE PESTLES.

PLATE XLII.

STONE PESTLES.

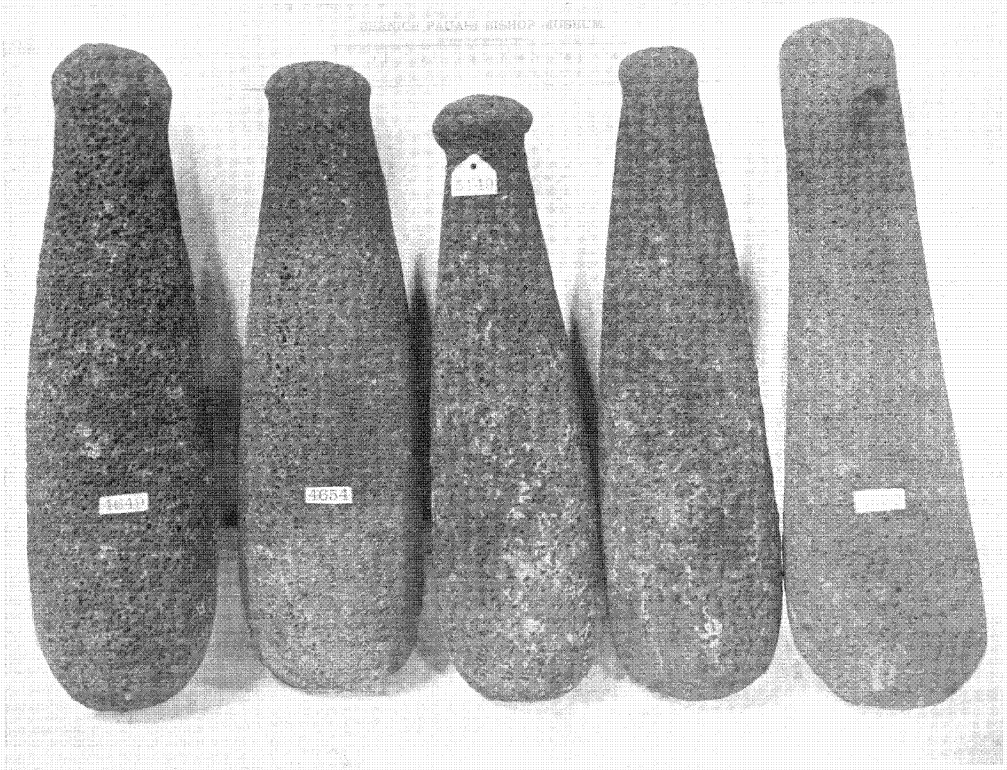
4649. Cellular lava; 13 in. long; weighs 5 lbs. 3 oz.

4654. Cellular lava; 12.5 in. long; weighs 6 lbs. 8 oz.

5149. Cellular lava; 11.7 in. long; weighs 5 lbs. 2 oz.

4647. Cellular lava; 12.7 in. long; weighs 6 lbs.

4650. Cellular lava; 13.4 in. long; weighs 6 lbs. 4 oz.



HAWAIIAN STONE PESTLES.

PLATE XLIII.

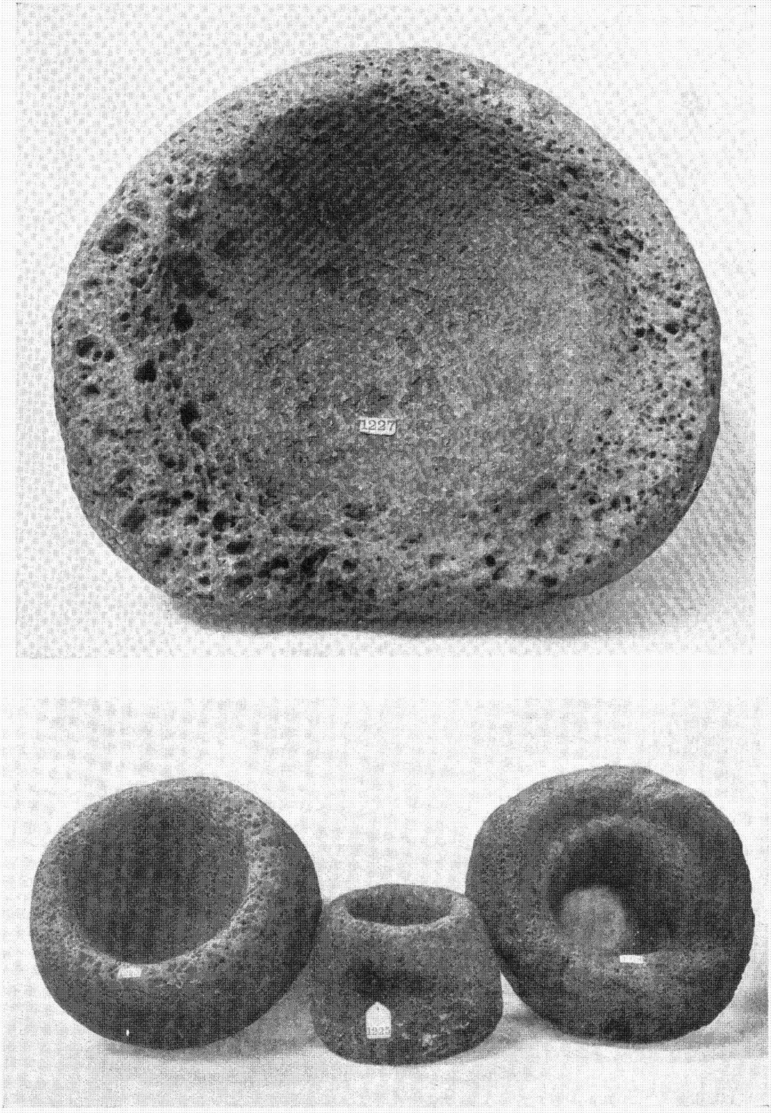
HAWAIIAN STONE MORTARS.

1227. Used for grinding awa; 15.5×13.5 in. in diameter.

1220. A large cup; 11×10.5 in. in diameter.

1225. Transition form to the high mortars of Kauai; 7 in. in diameter.

4078. From Nihoa; bottom worn out. From Queen Liliuokalani. 11.5×11 in. in diameter.

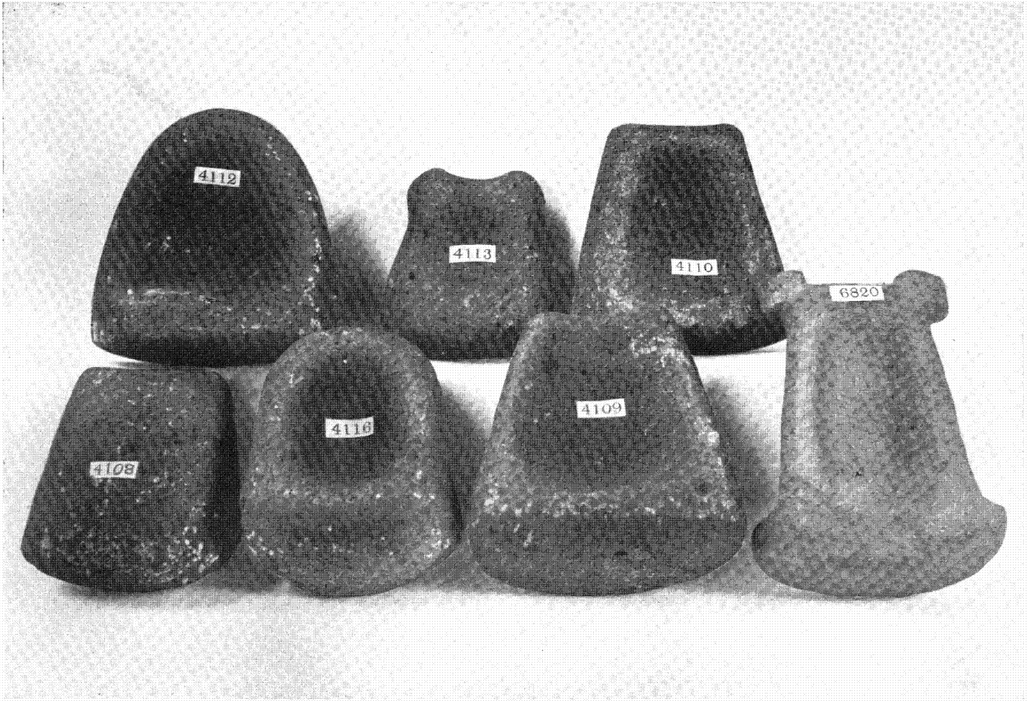


HAWAIIAN STONE MORTARS.

PLATE XLIV.

STIRRUP-LIKE POI POUNDERS FROM KAUAI.

6820. A cast from the original in the Peabody Museum at Harvard University.

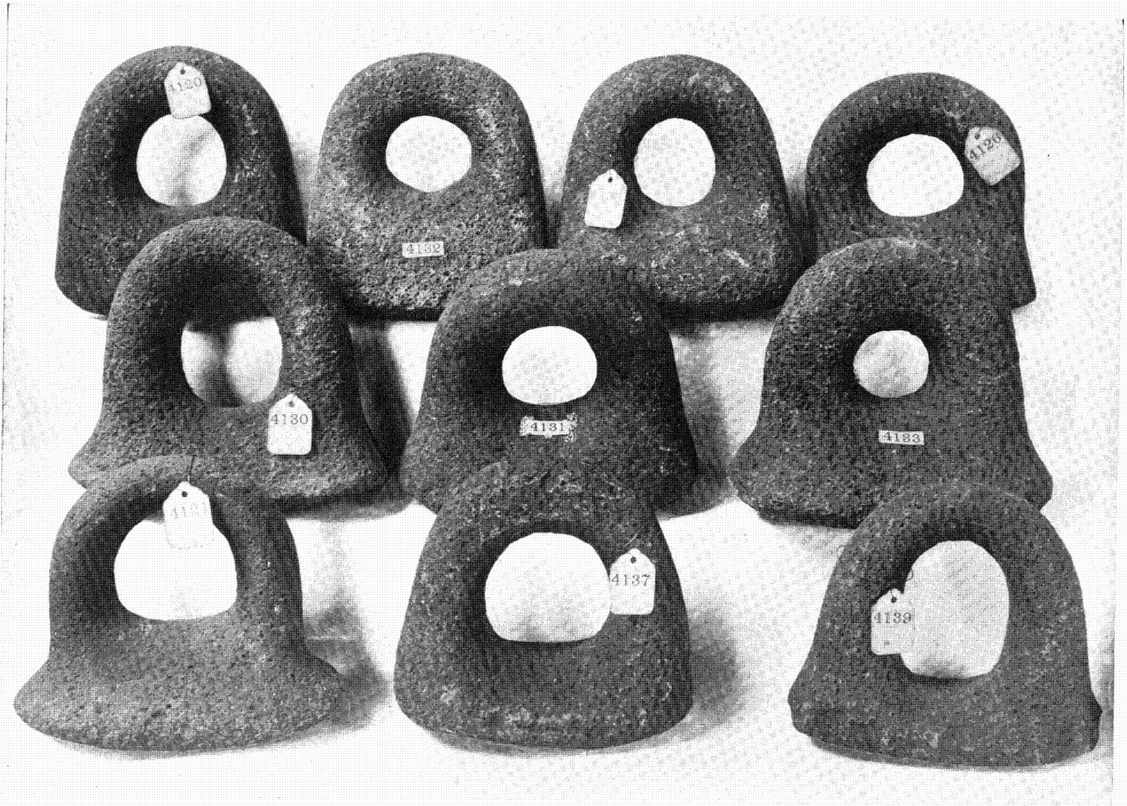

4112
4113
4110
6820
4108
4116
4109

STIRRUP-LIKE POUNDERS FROM KAUAI.

PLATE XLV.

Ring Poi Pounders from Kauai (Na Pohaku Puka).

4120.	4138.	4130.	4133.	4137.
4132.	4126.	4131.	4121.	4139.


4120
4132
4126
4130
4131
4183
4137
4139

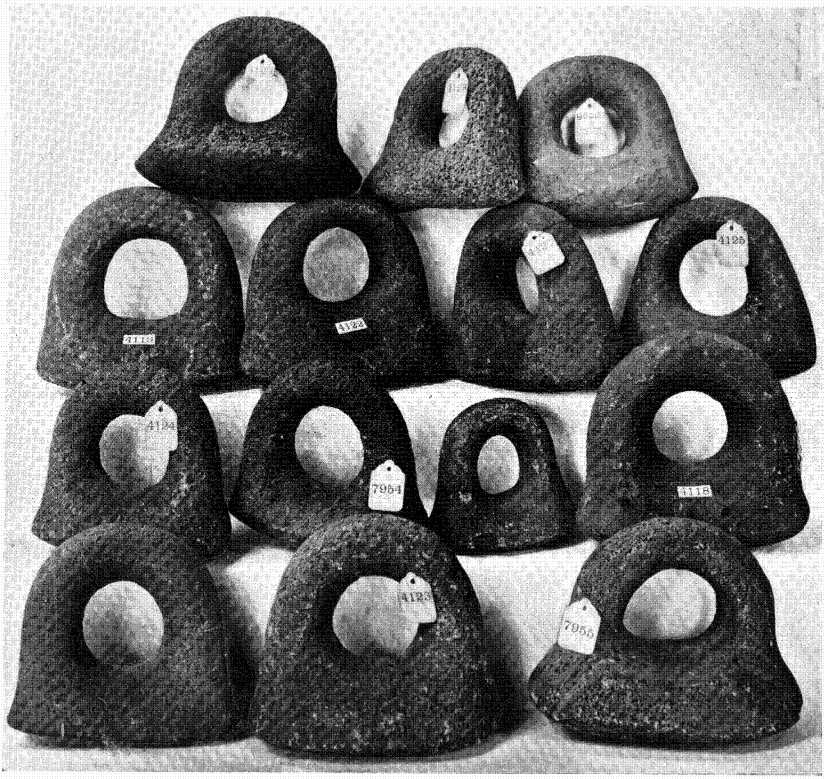
RING POI POUNDERS FROM KAUAI.

PLATE XLVI.

Ring Poi Pounders from Kauai.

4129. 4128. 8000. 4119. 4122. 4127. 4125.

4124. 7954. 4134. 4118. 4239. 4123. 7955.


4125
4119
4122
4124
7954
4118
4123
7955

RING POI POUNDERS FROM KAUAI.

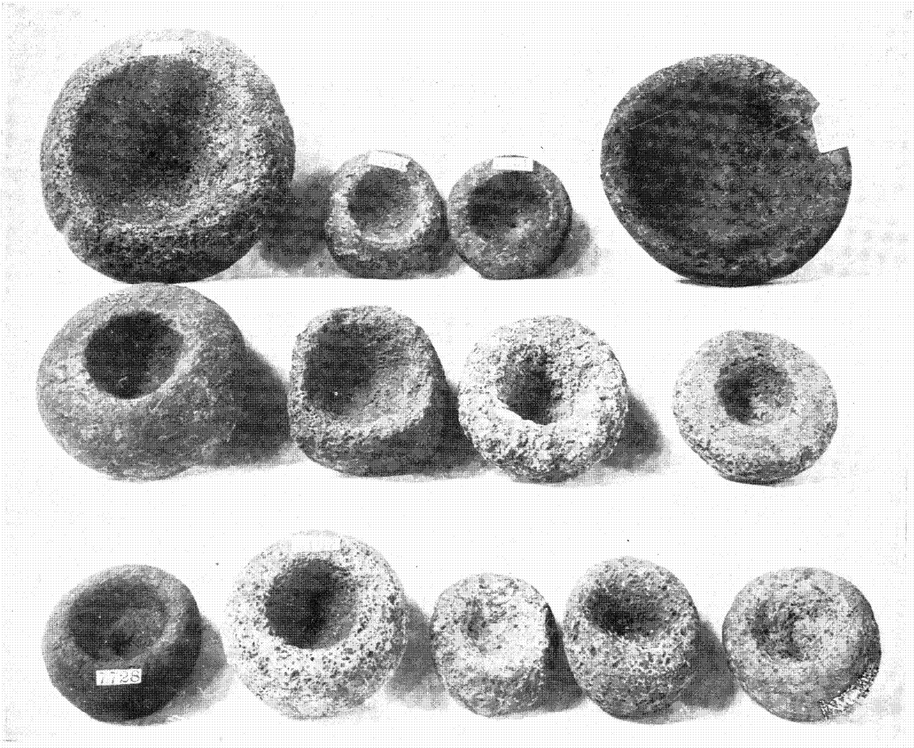
Plate XLVII.

Hawaiian Stone Mortars or Cups.

5163. 5164. 5161. 1229.

7925. 7926. 7927. 7928.

7728. 5162. 7929. 7930. 7931.

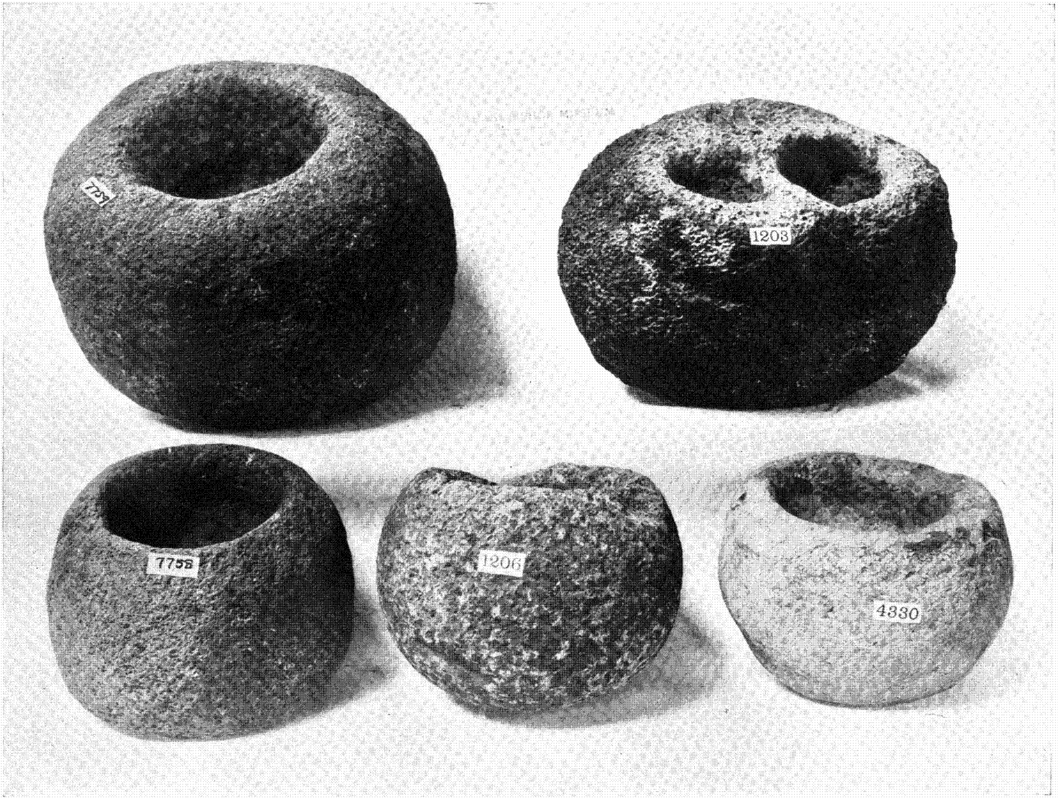


HAWAIIAN STONE MORTARS OR CUPS.

PLATE XLVIII.

HAWAIIAN STONE LAMPS.

7759. Deep cup with cistern.
1203. Three natural cups, two of them used.
7758. Flat base and very large cup.
1206. Almost spherical; broken on the lip.
4330. Cup with cistern.


7759
1203
7758
1206
4330

HAWAIIAN STONE LAMPS.

PLATE XLIX.

Hawaiian Stone Lamps.

1205. Square block of cellular lava with rounded corners.

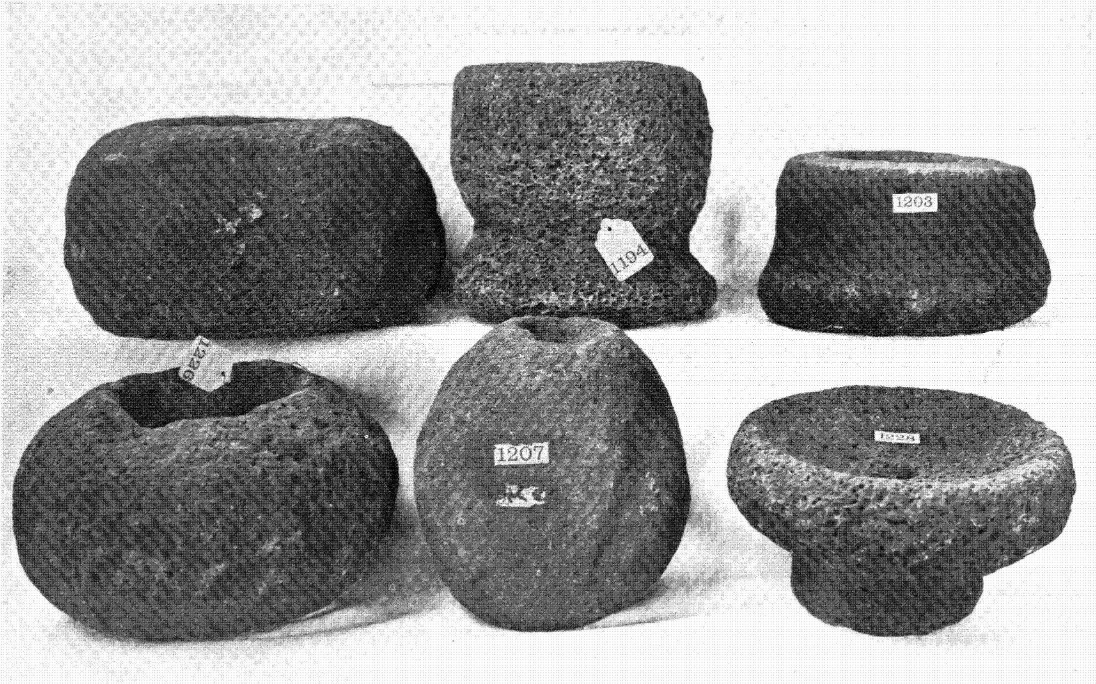
1194. The upper portion rudely pentagonal.

7691. Cup with cistern; saturated with burned oil. [Wrong number on plate.]

1226. Perhaps also used for a mortar.

1207. Unwrought, with very small cup.

1228. Cistern in a rather shallow cup.


1194
1203
1226
1207
1228

HAWAIIAN STONE LAMPS.

PLATE L.

Hawaiian Stone Lamps.

1208. Cup at each end, the upper one larger.

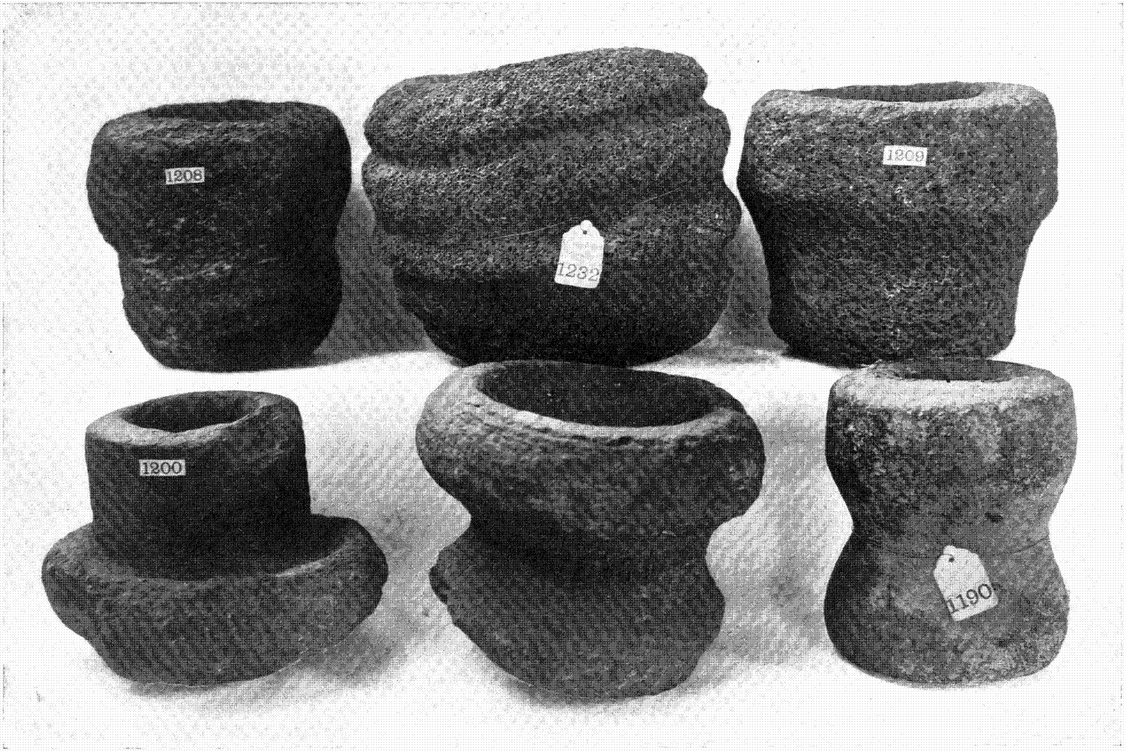
1232. Deep cup; found in 1880; Kulaokahua, Oahu.

1209. Large cup without cistern.

1200. Cistern in cup; rim for candlenuts; Kohala, Hawaii.

4333. Striated stone; round as if turned.

1190. Cups at both ends with cisterns.

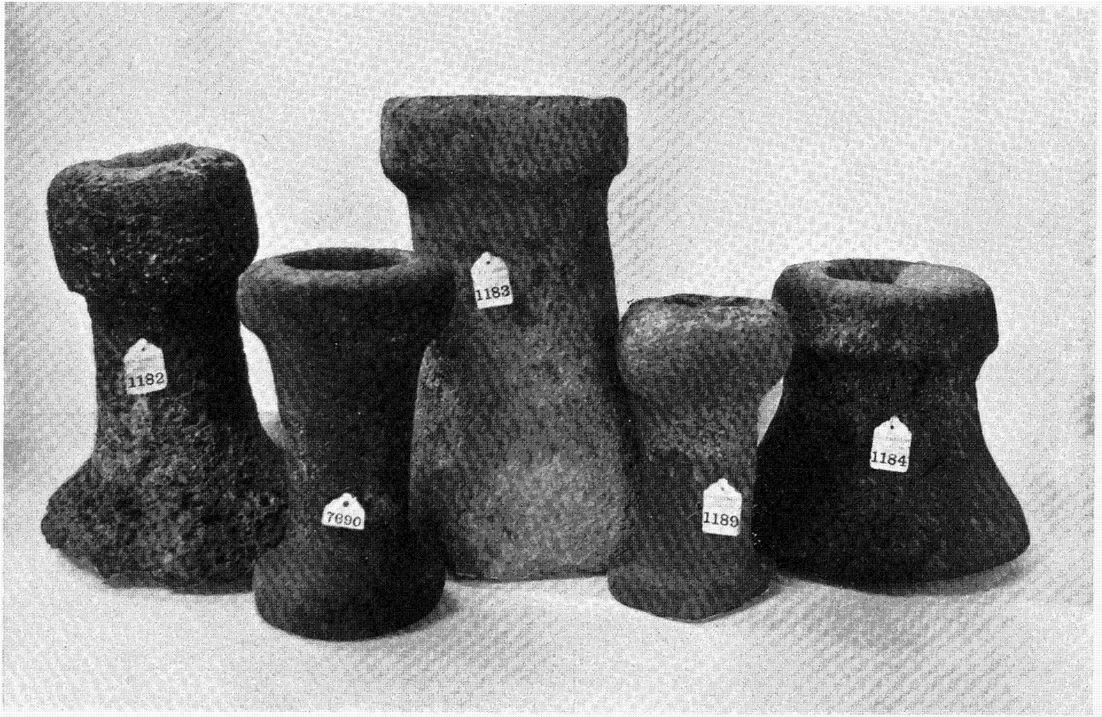

1208
1232
1209
1200
1190

HAWAIIAN STONE LAMPS.

PLATE LI.

HAWAIIAN STONE LAMPS. (NA POHO KUKUI.)
Mainly of phallic origin.

1182. 7690. 1183. 1189. 1184.

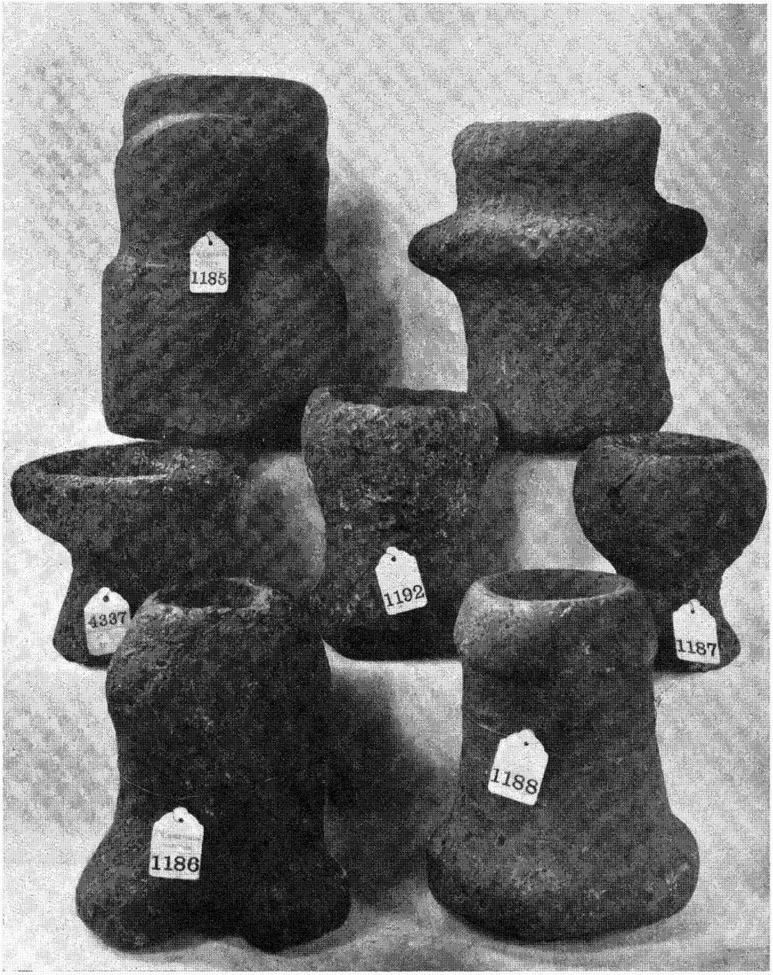

1182
7690
1183
1189
1184

HAWAIIAN STONE LAMPS.

PLATE LII.

HAWAIIAN STONE LAMPS.

1185. Shallow cup for nuts.
4340. Unusual rim.
4337. Broad top and narrow base.
1192. Cistern in the cup.
1187. Cup two inches deep.
1186. Small cup; four feet.
1188. Smooth finish, phallic.

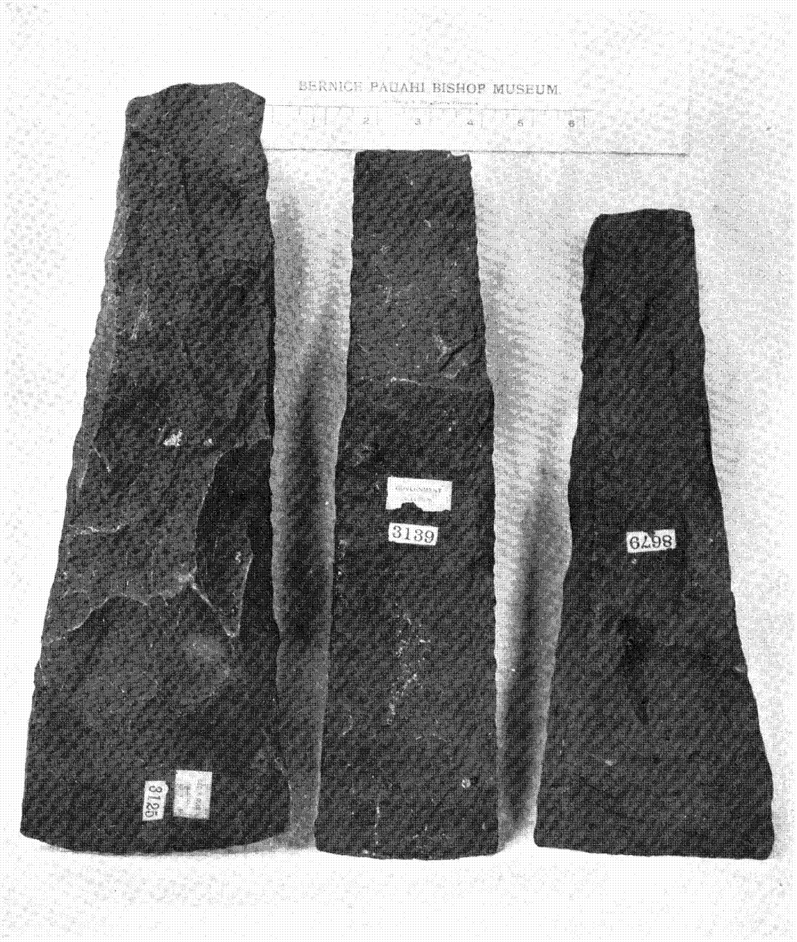

1185
1192
4337
1187
1186
1188

HAWAIIAN STONE LAMPS.

PLATE LIII.

Hawaiian Stone Adzes.

3125. 3139. 8679.

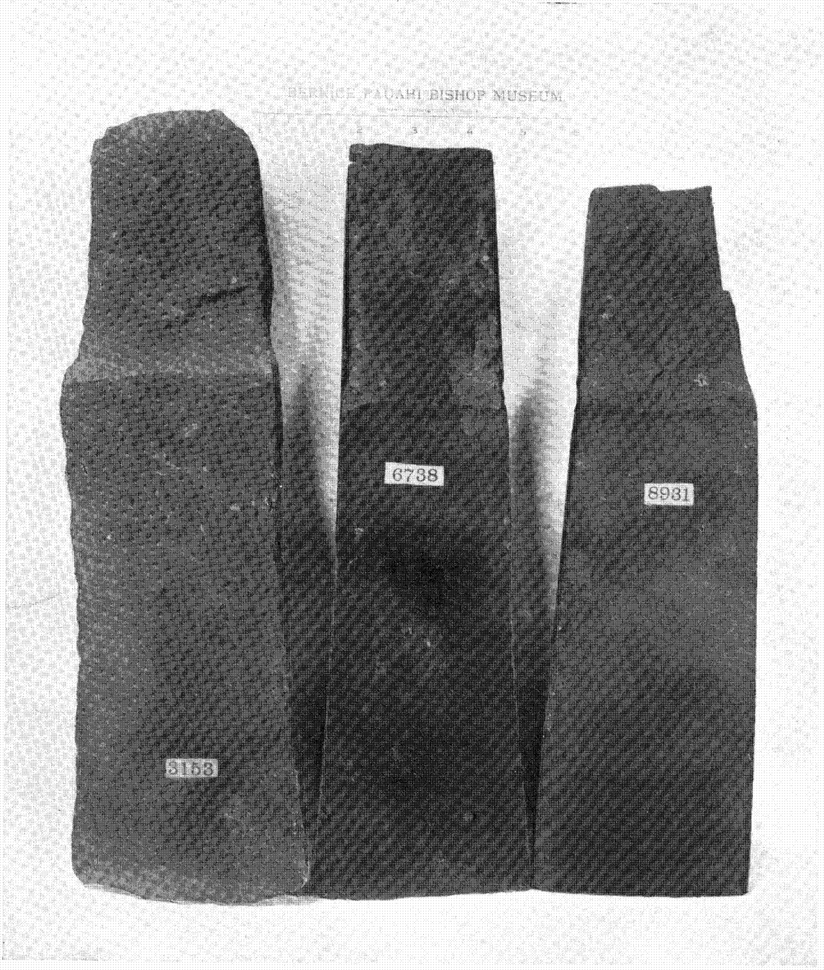

BERNICE PAUAHI BISHOP MUSEUM
1
2
3
4
5
6
3125
3139
8679

HAWAIIAN STONE ADZES.

PLATE LIV.

Hawaiian Stone Adzes.

3153. 6738. 8931.

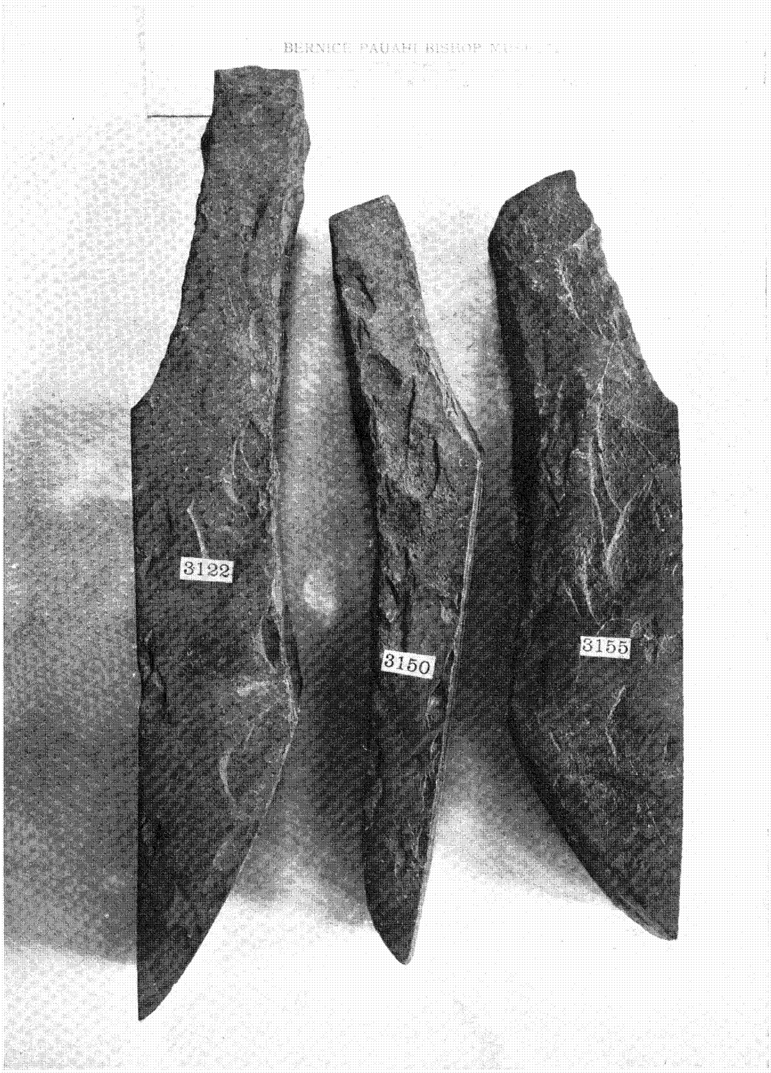

BERNICE PAUAHI BISHOP MUSEUM
6738
8931
3153

HAWAIIAN STONE ADZES,

PLATE LV.

HAWAIIAN STONE ADZES.
Viewed edgewise.

3122. 3150. 3155.

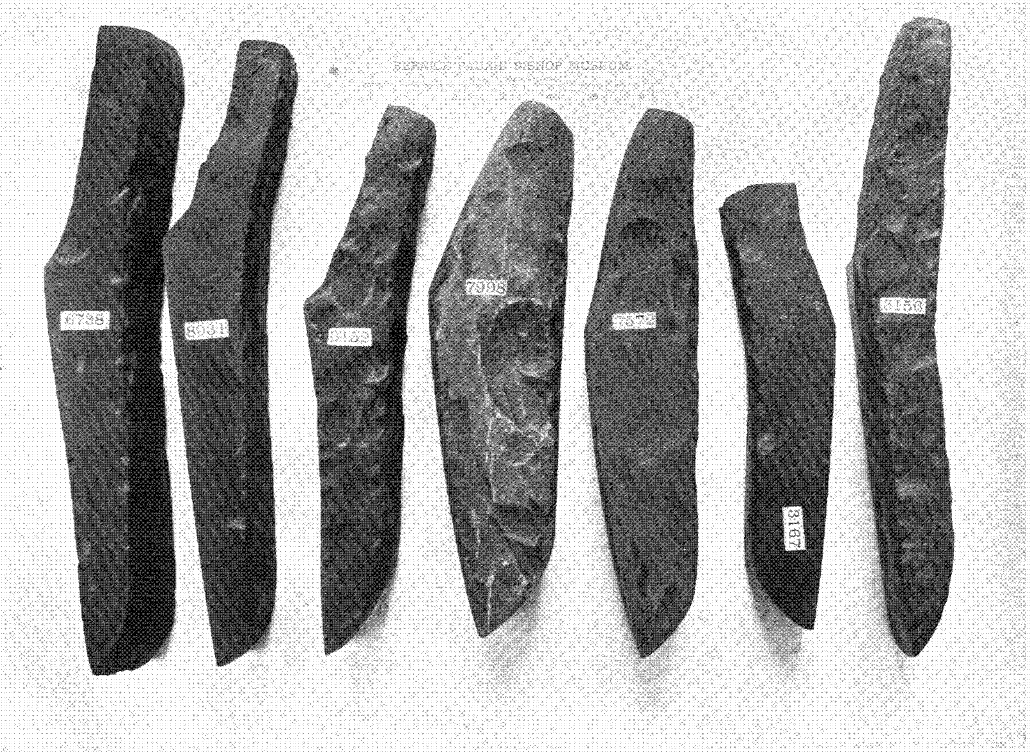

3122
3150
3155

HAWAIIAN STONE ADZES.

PLATE LVI.

Hawaiian Stone Adzes.

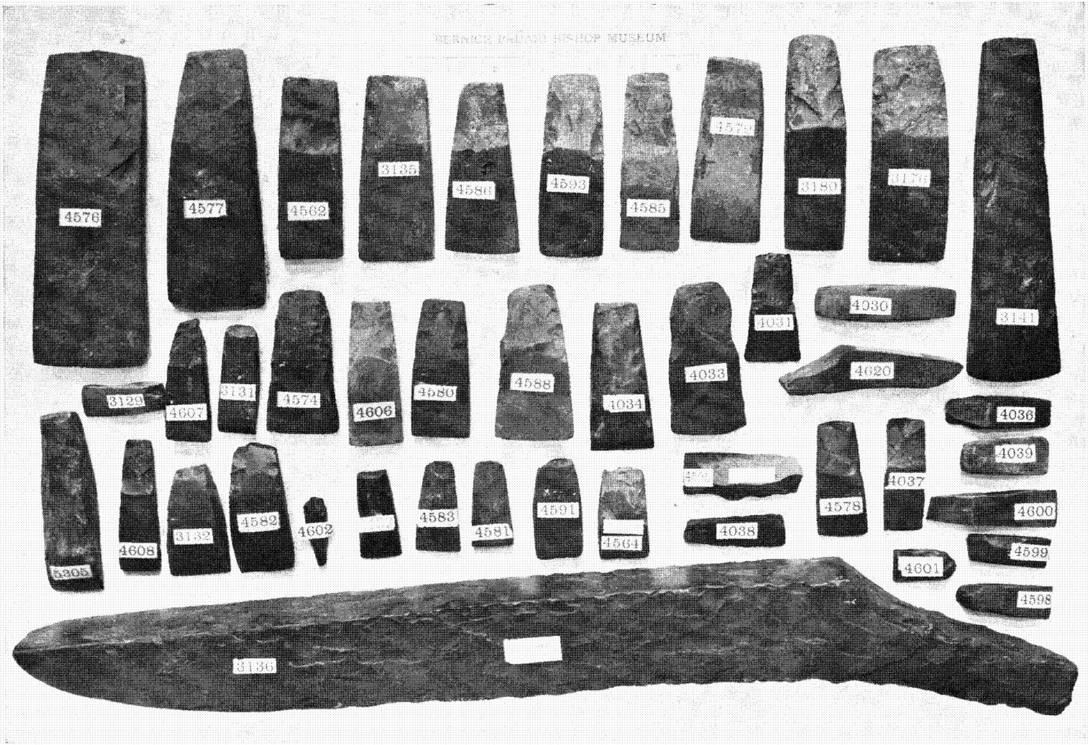
6738. 8931. 3152. 7998. 7572. 3167. 3156.


BERNICE PAUAHI BISHOP MUSEUM
6738
8931
3153
7998
7572
3167
3156

HAWAIIAN STONE ADZES.

PLATE LVII.

HAWAIIAN STONE ADZES.


4576
4577
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4586
4593
4585
4579
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4620
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3129
4607
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5305
4608
3132
4582
4602
4583
4581
4591
4564
4038
4578
4037
4600
4599
4601
4598
3136

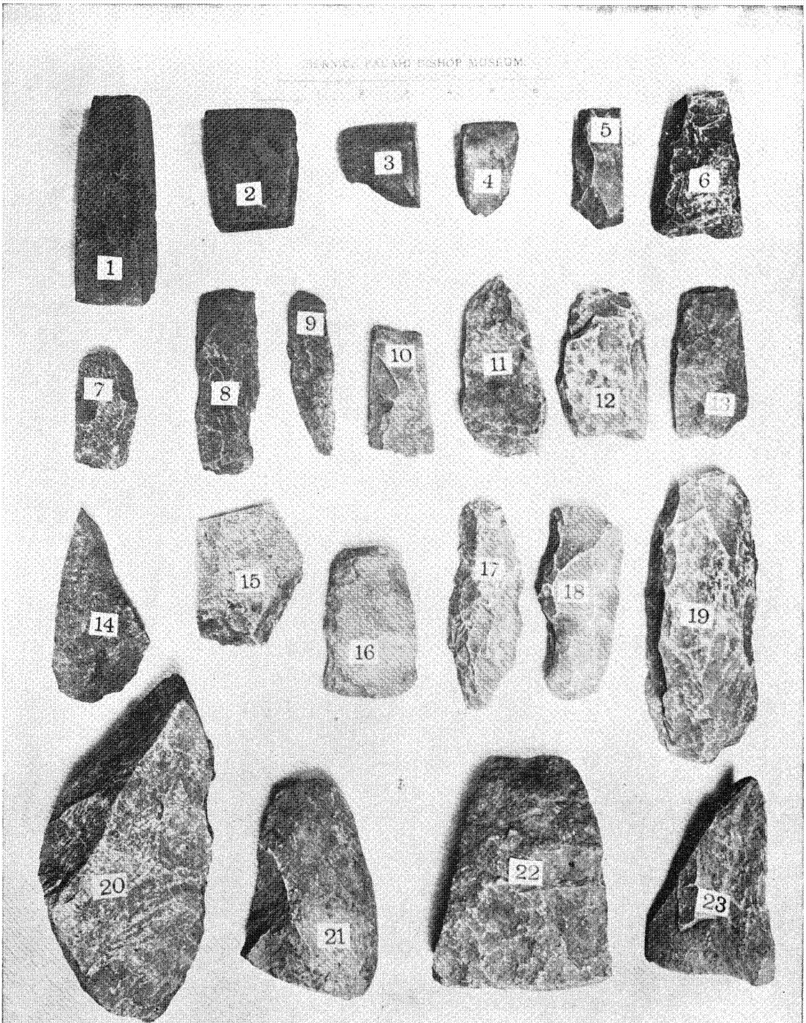
HAWAIIAN STONE ADZES.

PLATE LVIII.

FRAGMENTS FROM A WORKSHOP.

1. Tang of nearly finished adze, one side ground smooth, the other partly ground.
2. Distal end of well-ground adze, sides not ground.
3. Distal end of partly ground adze showing edge ground flat.
4. Distal end of well-finished sloping adze; conchoidal fracture.
5. Fragment, partly ground, of adze broken at both ends.
6. Roughed adze head; rejected for bad texture?
7. Fragment of flake or spall.
8. Adze fully shaped for grinding when corner of blade broke.
9. Cellular, highly silicious fragment.
10. Partly formed adze with sides ground.
11. End of flake.
12. End of flake.
13. End of flake.
14. Sharp end of spall, broad end showing striæ.
15. Fragment with a large flat cell.
16. Partly shaped flake for short adze; very solid.
17. Outside flake.
18. Partly formed adze.
19. Partly formed adze.

20–23. Cores.


BERNICE PAUAHI BISHOP MUSEUM
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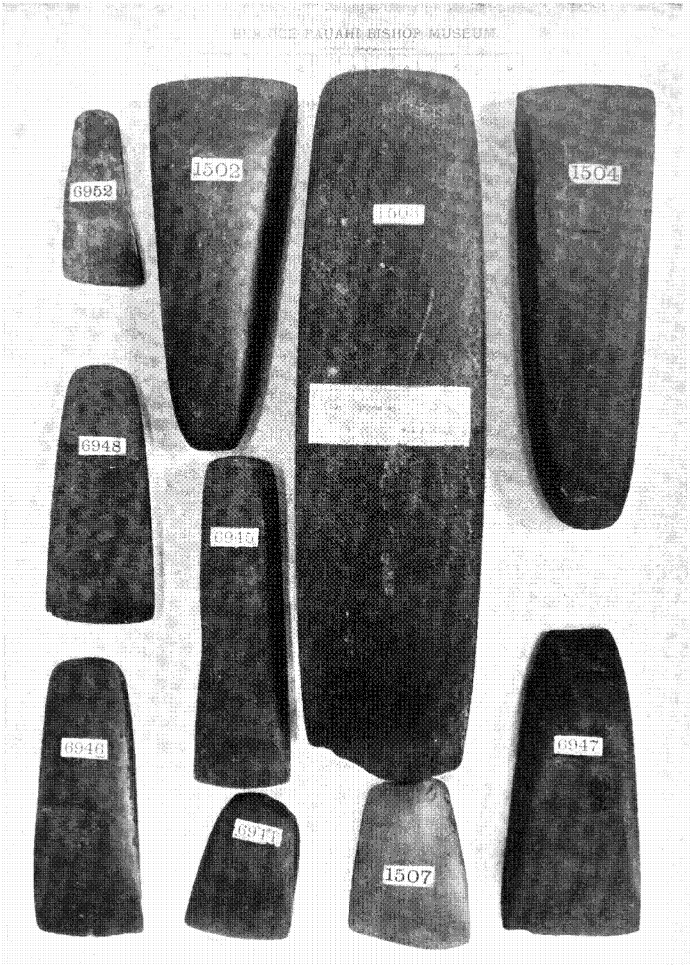
FRAGMENTS FROM A WORKSHOP: KAUAI.

PLATE LIX.

MAORI ADZES OR AXES.

6952. Thin jade; angular blade.
1502. Brown phonolite.
1503. Transverse ridge, no tang.
1504. Grey stone, sides beveled on top.
6948. Brown phonolite.
6945. Brown lava or phonolite.
6946.
6944. Dark phonolite, angular blade.
1507. Light greenstone, blade at angle.
6947. Grey lava, sides beveled.


BERNICE PAUAHI BISHOP MUSEUM
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1502
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1504
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6944
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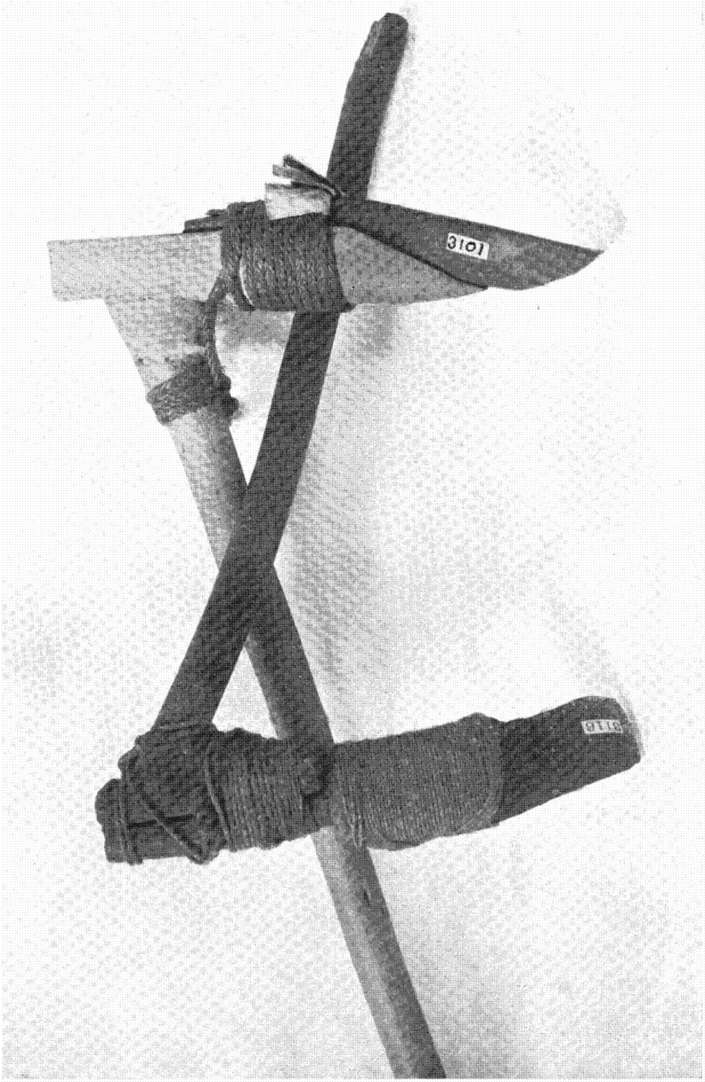
MAORI ADZES OR AXES.

PLATE LX.

HAWAIIAN ADZES HANDLED.

3116. An adjustable adze of the Kupaaikee pattern. It can be made either left- or right-handed, for canoe excavating, etc.

3101. An ordinary adze with the blade attached by coconut fibre braid.



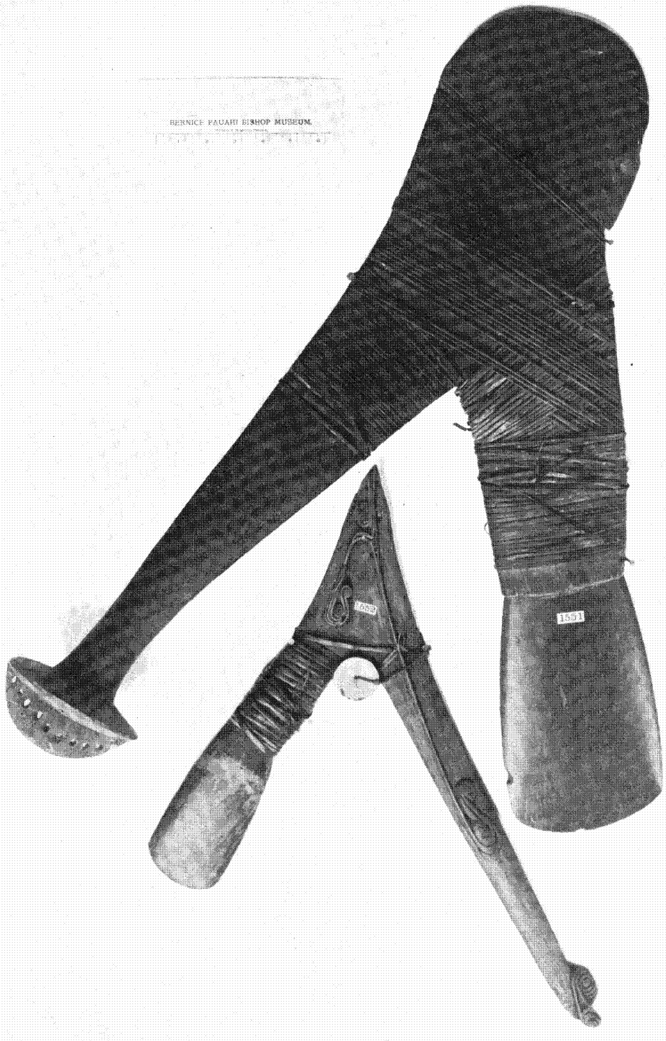
HAWAIIAN ADZES HANDLED.

PLATE LXI.

FLAT CEREMONIAL AXES.

1551. From Duau, of the D'Entrecasteaux group, The blade of jadeite, although large, is flat and thin. The end of the handle was formerly decorated with feathers.

1552. From Huon gulf, New Guinea. The blade is similar to the last, but much smaller. The handle is artistically carved. Native name, Ki.

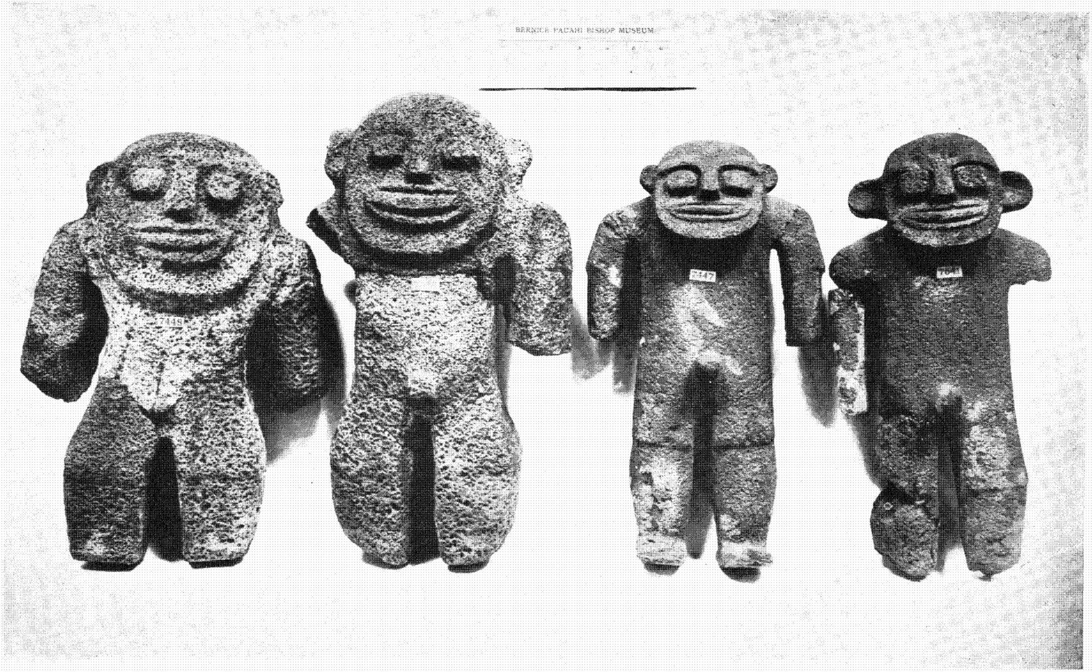

BERNICE PAUAHI BISHOP MUSEUM
1662
1551

FLAT CEREMONIAL AXES.

PLATE LXII.

STONE IMAGES FROM NECKER ISLAND.

Found in fragments on this uninhabited island. The first two are of coarser lava than the last two, and all seem to be made of common Hawaiian material.


BERNICE PAUAHI BISHOP MUSEUM
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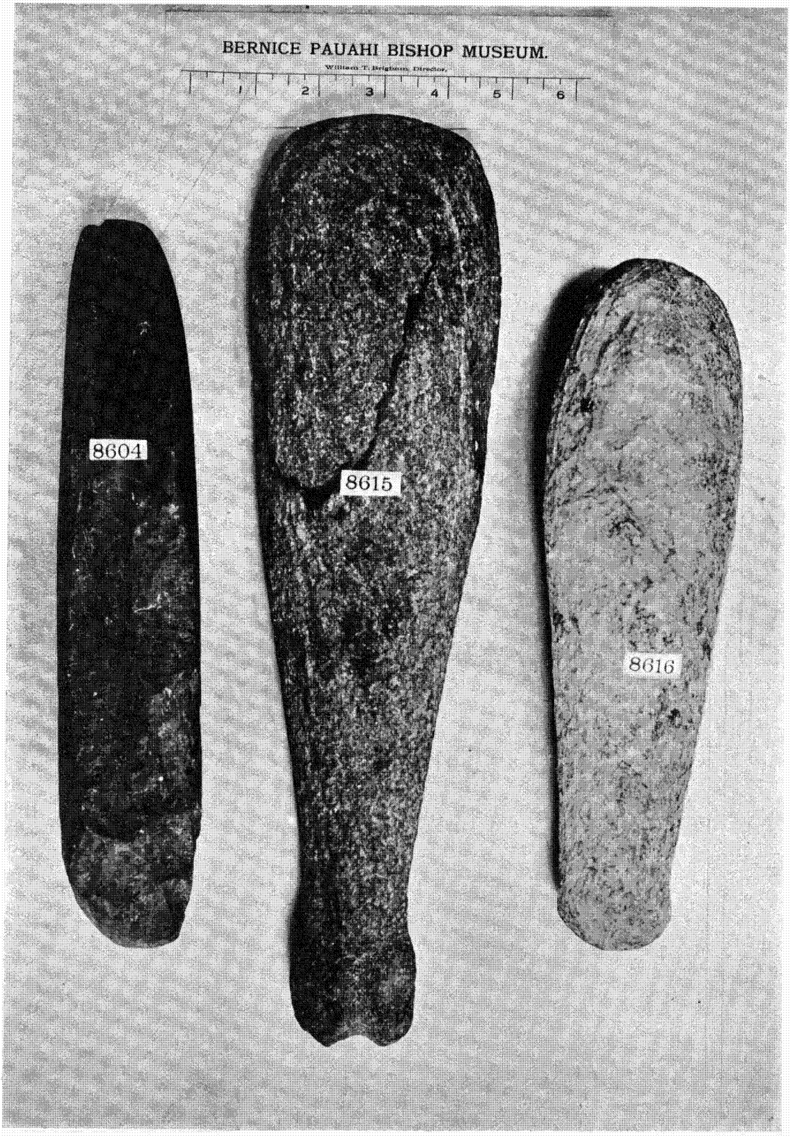
IMAGES FROM NECKER ISLAND, H. I.

PLATE LXIII.

PRIMITIVE MORIORI CLUBS.
Chatham Islands.

8604.	8615.	8616.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William T. Brigham, Director.
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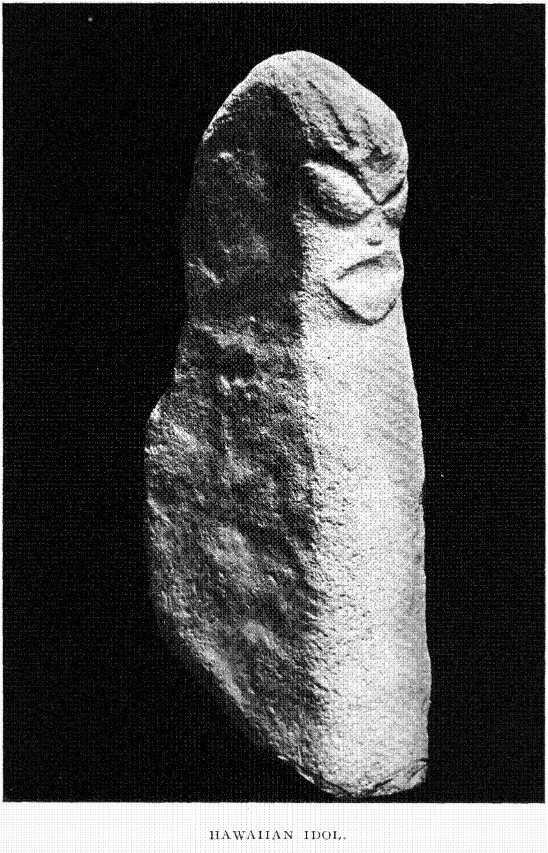
PRIMITIVE MORIORI CLUBS.

PLATE LXIV.

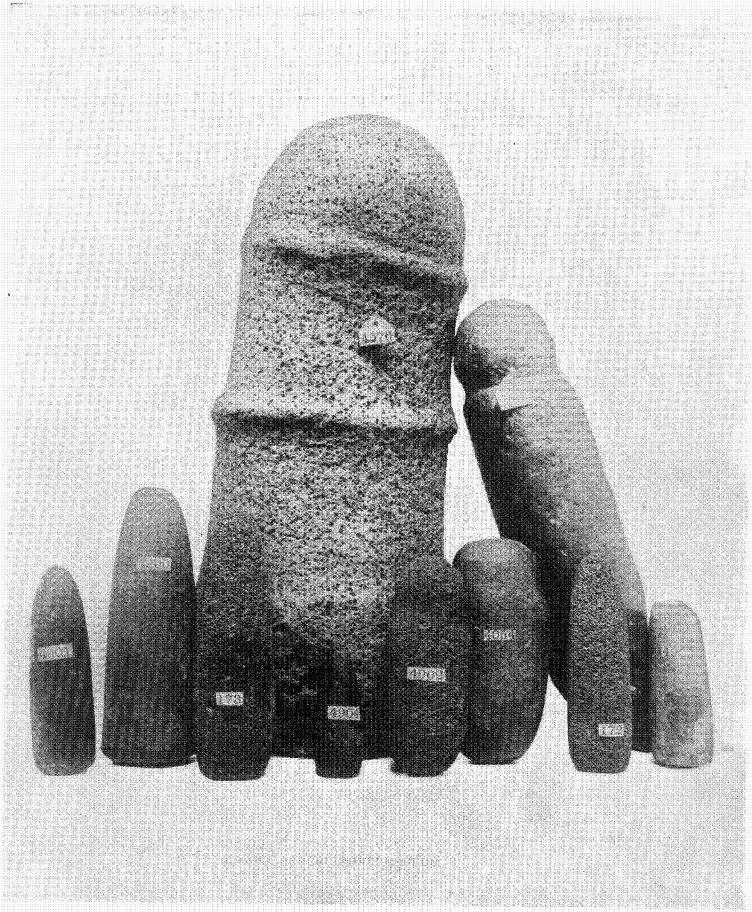
IDOL FORMERLY AT KAHUKU.



HAWAIIAN IDOL.

PLATE LXV.

PHALLIC EMBLEMS.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